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HENRY V. POOR, Editor.

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Saturday, April 7, 1849.

Devlan's Machinery Oil.

THE Subscribers, Agents for P. S. Devlan & Co's "Patent Lubricating Oil"—price 80c. per gallon 4 mos. or 3 per cent off for cash.

We refer to the following certificate of Messrs. Norris Brothers, in whose works, any one by calling can see the oil in use and judge for themselves.

NORRIS' LOCOMOTIVE WORKS.
Philadelphia, April 2, 1849.

We have been using throughout our Works, during the last six weeks, "Devlan's Lubricating Oil," and so far as we have been able to judge from its use, we think it paeferable to the sperm oil generally used, for both heavy and light bearings. NORRIS BROTHERS.

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Explosion of Locomotive Engines.

After our article upon the Explosion of Locomotive Engines, under date of March 17, had gone to press, we received a copy of the Report of a Committee on this subject, read before the Boston Society of Civil Engineers, March 6, 1849, called forth by the explosion of the engine "Taghconic," on the Boston and Providence Railroad, on 1st of February last, before referred to. We have also re-examined the reports, spoken of in our previous article, in regard to the engine "*Richmond*," with a view to more thoroughly appreciate the force of the hypothesis assumed by the Committee of the Boston Society of Engineers.

We have also received various suggestions from several engine builders and other parties who have been led to interest themselves in the matter, and we notice that the subject has been quite fully treated upon in several newspapers in different parts of the country.

Regarding the subject as one of the most profound importance to the whole public, and most deeply interesting to the engineering profession, and in fact to all persons in any way connected with Railroads, we had determined to call the attention of our readers to the matter, in the hope that by the application of appropriate remedies, similar calamities might be hereafter avoided.

The present week has brought to us the report of a similar catastrophe. On the 2d instant, an explosion took place on the Eastern Railroad, upon an engine used in a gravel train in the neighborhood of Chelsea, by which the fireman was instantly killed.

We have not as yet received full particulars in regard to the cause of this recent catastrophe. All we see is, that it is stated that the engine was an old one, having been one of those built by *the Machine Shop of the Locks and Canals* at Lowell, of about 11 tons weight, and that it was unfit for use.

If so, it is an admonition to all railroad companies to use more care in the working of old engines. We trust there will be a thorough investigation as to all the facts of the case, as the public is becoming more and more sensitive on the subject. The earlier built roads and engines are both going rapidly to decay. More thorough workmanship is required, to sustain the increased weight which greater speed and heavier trains now impose upon railroads.—Increased skill and more thorough knowledge of machinery than formerly are required, on the part of engineers, superintendants and engine drivers to ensure proper confidence on the part of the public, in the working of our complex railway system.

To return once more to the case of the "Richmond." It is asserted that one of her pumps alone, was amply sufficient to supply water for her boilers, and that the position taken in the Report of the Committee of the Franklin Institute, that in consequence of defect in the working of one of her pumps, the supply of water was withheld, and that this finally led to the explosion—is not sustained by the facts in the case.

Dr. Lardner, on pages 12 and 13 of his Report, says:

"If the water had been suffered to boil down so as to leave the crown piece and the upper flues uncovered, those parts must have been red hot or nearly so. The condition of copper tubes which have been red hot is easily recognised. Those in the boiler show none of the signs of having been overheated. It has in short all the appearance of having been kept under water. None of the tubes have collapsed. The crown piece of the fire place shows none of the indications of having been incandescent.—Among other appearances against this, one seems to be absolutely conclusive—the soot still remains thick on the under side of the crown piece. Indeed I can positively pledge my judgment that neither the fire box nor the flues have been overheated."

It is also further asserted, that the wooden casing of the boiler of the Richmond was not charred—clearly showing that the same could not have been overheated. Whereas, in the case of the Taghconic, the evidence was full and abundant that the wooden casing was charred to such a degree as to indicate an intense heat upon the boiler.

Without going over the ground again in regard to the Richmond, we still adhere to the opinion that in that case the catastrophe was caused, not so much from any defect of the engine, or proper working of any of its parts, as from the want of proper care and watchfulness on the part of the engine driver, arising from over confidence in the capacity of his engine to sustain an extraordinary pressure of steam, and that he allowed, from some cause or other, the water in the boiler to become overheated, and then, by suddenly throwing in a fresh supply, it was suddenly converted into a volume of highly elastic steam sufficient to cause the explosion.

The explosion of the Taghconic locomotive, was the first accident of the kind in New England. The public attention was generally called to the subject, and the Report of the Committee of Engine Builders, published by us, seemed to us quite satisfactory as to the cause of the catastrophe, though we think they should have gone further, and spoken more freely of the remedy. It is known that similar explosions take place in steamboat boilers. The case of the explosion of the steamer "*Moselle*," a few years ago, on the Ohio, and a more recent one in the case of the "*Ticonic*," on the Kennebec, are attributable to the same cause, and are in all their leading features precisely alike. Both these boats had been lying still, and without any escape of steam—the fires were kept up in full blast, and on the first movement of the engine they exploded with the most terrific consequences.

In cases like this of the Taghconic, there is an unwillingness on the part of builders of engines to speak out fully their own impressions. Locomotive engine builders in England and the United States formerly regarded the insertion of the safety plug as indispensable to safety, in running at high speed. It is believed, that with a proper safety plug, in the

ordinary condition of boilers, an explosion cannot take place. So too with steamboat engines, by the proper application of Wirthington's patent steam pump the condition of the water in a boiler may be at any time ascertained, and the danger of explosions avoided.

The question arises, why are the *safety plugs* now laid aside? We are told that they are frequently taken out and their places filled with an iron plug, or some infusible metal. Unskilful men frequently occupy positions as superintendents and engine drivers. Occasionally these plugs melt out, letting the water into the fire box, extinguishing the fire, and causing the stopping of trains. These delays are an annoyance, and the unskilled manager of a road prefers to trust the strength of his boiler, than incur the chances of delay, and hence orders for locomotives allow builders to omit this precautionary remedy in many of the modern engines.

We throw out these suggestions without any intention of casting reflections upon any one, more especially those connected with the several roads where these explosions have occurred. We speak of facts which have come to our knowledge elsewhere, and throw out these suggestions in the hope of inviting full discussion of the matters in hand. There is no question in the whole range of railway economy so important as this. The locomotive holds the same relation to the railway system that the brain does to the human frame.

We think it due to the parties interested in this discussion, and indeed we regard the question of so much importance, that we are induced to spread before our readers the substance of the report of the committee of the Boston association of Civil Engineers, drawn up by W. P. Parrott, Esq. We desire also to place all the facts on record for future reference and use. The report says:

"This locomotive engine (one of the largest class now used) started from the Providence station with the passenger train from New York, via Stonington, on the 1st of February. The engineman was Mr. Lucius Cummings, who is represented by those acquainted with him, to have been a very competent and steady man. He had been in the service of the Boston and Providence railroad company about ten years, and for the last seven years had been in the charge of a locomotive engine.

The train proceeded on in the usual course from Providence to the station at Mansfield, ten miles from the point where the explosion took place. At this place it passed the freight train. The only fact having any bearing upon the accident up to this, was the remark of the engineman of the freight train, that the 'Taghconic' was blowing off steam freely, when she passed him at this place.

From Mansfield station, the narrative of George Lignham, the fireman, was taken for the statement of facts relative to the running and appearance of the engine, which was as follows, (substituting distances for points on the road noted by him):

"At Mansfield we stopped and took in wood and water; tried the upper gauge cock and found water and steam; safety valves blowing off We started from Mansfield with one pump on; 1600 feet from the starting point, filled the furnace with wood; 13,000 feet, filled the furnace again. From this point, we ran a distance of about 10,000 feet to the summit, where the throttle was shut off to less than half its opening, and the furnace door was opened.—Thence about 4,000 feet, where a few sticks of wood (four or five) were thrown into the furnace. Thence 1500 feet to the top of the inclined plane, where the throttle valve was entirely shut, and both pumps put on, and the furnace door shut. At a distance of about 8,000 feet the pumps were tried; they worked water. Thence 7,500 feet and the gauge cocks were tried; the upper cock showed water. The engineer took down his lantern at this time and examined the flow of water carefully: remarked that he had never seen the pumps work better, and told me to shut off both pumps, which was done, as he remarked, we should get a strike when we got on the bridge; meaning that when the steam was again let into the cylinders, the water would be thrown over into them on account of its being so high in the boiler. I asked Mr. Cummings if I should fire up. He replied No; that he wished to run easy, as the night was dark and we were about running through the switch at the part of the road where the Stoughton branch leaves the main track. I did not fire up. We ran on this way 5,500 feet, to the viaduct, where the explosion took place.

At the moment of the explosion, I was in a stooping position, moving a piece of wood in the way of the brake, which I was about to use. I recollect Mr. Cummings reaching for the cord connecting with the steam whistle, when the explosion took place. I cannot recollect having heard the whistle. When I recovered after the explosion, I called for the engineer, but he had been killed instantly by the explosion; my life was saved by being in the stooping position before mentioned. I put down the brake, and stopped the engine. My clothes were wet somewhat, but probably from the water from the tank in the tender. I was not scalded, but my face was burned. I saw no indication of hot water having been thrown on to Mr. Cummings—he was not scalded.

There was very little fire in the furnace after the explosion; it was put out with water. I cannot tell how long after the explosion it was put out."

The explosion took place about 5¼ A. M., February 1st.

Description of the boiler after the explosion, made February 10th, 1849.

This examination was made ten days after the disaster occurred. The engine had been removed to the repair shop, part of the wreck cleared away, and part of the tubes had been removed: otherwise it was in the same state as it was immediately after the accident.

The explosion had apparently torn off the whole top of the boiler over the furnace, between the waist of the boiler and the front plate of the furnace down to the level of the frame of the engine. The fracture was irregular; in some cases following the line of rivets, in others giving way between the line of rivets at the angle where it joined the waist, and in other parts leaving a width of 3 to 4 inches attached to the boiler, where the parts are rejoined, or tearing off 3 or 4 inches inside of the lap.

Some parts of the iron was apparently broken, in other parts evidently torn apart. The front plate was entire, bent outwards to some extent, and two of the long stay bolts broken off. All the short stay bolts were drawn from their connection with the other parts, throughout the whole extent of the fracture.

The whole body of the boiler at the furnace end was bent downwards, and bore upon the shaft of the engine.

The crown of the fire box slightly bent downwards, but no visible fracture of the parts.

The whole of that part of the engine and machinery over the fire box was fractured, and the most part carried away.

The forward part, though deranged by the accident, being twisted and dislocated, did not indicate that any part of the boiler, or other parts removed, took that direction, but that the explosion was toward, and backwards from the direction in which the train was moving.

The boiler showed every indication that either before or after the explosion, it had been subject to a great heat.

Some parts of the iron showed evident marks of heat; the tubes in the middle and lower part were scaled by the heat, and the brazing or soldier in the joints to some extent melted out. The tubes on the upper row and those at the sides did not show that they had been heated more than is usual for the working of an engine.

The wooden casing of the boiler was charred through its whole extent to a depth of 8.10 of its thickness, and at the joints of the plates it was entirely burnt to a coal. The sheet iron, which covered the wooden casing, was discolored in a small degree in one or two spots, otherwise it did not show any effect of heat.

The inside of the boiler and the outside of the tubes were covered with the usual incrustation found in steam boilers, in all places, where heat had not scalded it off.

One of the safety valves remained in place at the time of the examination; the other was gone, and the lever broken and bent by the explosion.

The appearance of the pumps, when the engine was taken apart for the purpose of repairing it showed no indication that they had been out of order.

The grades of the road, over which this engine was working, are as follows:

From Mansfield.

3000 feet, 18 feet per mile ascending.
1300 " 24 " "
21,700 " 10 1-2 to ft. per mile ascending.
5900 " Level—Summit.
20,000 " descending 35 to 40 feet per mile to the point where the explosion took place.

Thus it appears that after leaving the station, at Mansfield, the engine worked for a distance of about 5 miles, up an ascending grade of different inclinations, varying from 10 1-2 to 34 feet per mile; then over a level of one mile; then on a down grade of 35 to 40 feet per mile, 4 miles, to the point where the accident happened.

The wind at the time was NE. and a snow storm commencing.

Having made this statement of facts, it might be proper under most circumstances, that your committee should stop here; but as the actual investigation of a subject gives an advantage in the thorough understanding of the whole subject, matter, which the reading of a recital of facts will not generally give, we shall venture to trespass upon your indulgence, to again recite some of the most prominent facts connected with this disaster, and submit such comparisons and conclusions as we have been able to make; in order that, as far as in us lies, we may do our part to prevent, if possible, the recurrence of a similar accident.

The appearance of the boiler after the explosion shows that the shell and part of the tubes had been subjected to an immense heat, and also that water had been suddenly applied to the surface of the tubes;—the evidence of this last fact is the appearance of the copper. The appearance can be only produced by heating to nearly a red heat, and then plunging it suddenly into water.

The explosion appeared to follow immediately upon opening the steam whistle, as the man at the station says that he heard the sound of the whistle and the report of the explosion, as it were, at the same moment of time.

An apparently obvious solution of the problem at once presents itself:

1st. That the water was low in the boiler.

2d. That the whole interior of it was heated to a high temperature.

3d. That opening the steam whistle caused the water to rise immediately, to come into contact with the heated tubes and sides of the boiler, thus producing a volume of highly elastic steam, which the boiler could not resist.

But this solution will not satisfy the conditions of all the evidence.

It is conceded by all persons having competent knowledge of the matter, who have been seen by your committee, that Mr. Cummings, who had charge of the engine, was an experienced and competent man, not liable to be deceived by the foaming of the engine, and, least of all, to be deceived by his pumps.

The testimony of the fireman also proves that all the time from leaving Mansfield, up to almost the instant of the explosion, one pump was in action, and that part of the time two pumps were on. That the pet cocks were tried once at least, and that they indicated full action of the pumps. This being the case, the injection into the boiler must have been going on in its usual manner. Added to which is the consideration, that the engine man, after a careful examination of his gauge cocks and his pumps, ordered them to be shut off, because he feared his boiler would be too full of water.

Another proof that the water was not nearly all out of the boiler, is the fact that the tubes were not generally burned, the heated appearance being confined to the middle of the mass of tubes, the outside and top of the mass showing no indication of undue heat. A specimen of one of these tubes is presented.

It shows the usual appearance of tubes in an engine properly worked; even the particles of carbon on the inside, usually found in than, are remaining, and it seems impossible from this testimony to believe that these tubes had been uncovered by the water.

The received opinion at present is, that boilers are either burst by crowding upon them too great a pressure of steam while working, or by allowing the water to leave the parts of the boiler exposed to heat, and afterwards suddenly throwing the water upon those heated parts, either by ejection of cold water or by altering the position of the boiler (as in steamboats,) or by a sudden foaming or ebullition of the contained water, by opening some of the apertures in the boiler. The present case under consideration has but one of these circumstances attached to it, to wit: opening the steam whistle; which occasion ebullition or foaming. The previous condition of want of water is not supported by the evidence;—but the whole of the testimony, both of living witnesses and the appearance of the boiler itself, is opposed to this position.

We can therefore assume that this accident was occasioned by an excessive pressure of steam, greater than the resistance of the shell of the boiler. From whence came this excessive pressure? As the testimony before recorded is not reconcilable with the supposition that the boiler was insufficiently supplied with water, your committee was induced to seek further for a solution of the problem, in examining the recorded cases of exploration, and different papers written in this and other countries, upon the subject of the explosion of steam boilers.

In most of these cases a direct cause has been assigned for the result, either from bad pump or actual or supposed defect in the safety valves.

Some of the most prominent cases are noted for the purpose of reference for those members of the Society, who may wish to examine further into the subject, and a note is subjoined for that purpose; rather than to swell this report with extracts from them.

It will be seen that all the locomotive engines have burst downwards with great loss of life and injury to property. This case is different the explosion being upwards. In some of the other cases of tubular boilers, the outside shell has given way, mostly from an eviden weakness in the plates.

In the course of this examination, a theory but litle known in this country, but one evidently much considered in Europe, seemed to your committee to meet the conditions of this case more fully than any other, and induced a further examination, and comparison of the evidence. It is now presented solely for consideration, without taking the ground that it was actually the cause, but that there is strong probability that it may have been.

The theory alluded to is the property of repulsion noticed in fluids, when placed in vessels heated above the point of maximum evaporation. This property has been quite fully investigated by Claproth, Boutigny, Perkins, and by the committee of the Franklin Institute, and others.

A very interesting and instructive paper upon this subject, by J. E. Bowman, Esq., read before the Royal Manchester Institution, February 17th, 1845, is recorded in the Journal of the Franklin Institute, Vol. 36, (1845) pages 182 and 268.

As the conclusion of that paper seems to afford a proper solution in this case, we take the liberty of making an extract from it.

After reciting the different experiments, he says:

"If water be now gradually thrown into an over heated boiler, we know from what has already been said, that it will pass into a spheroidal state, and will continue at 500 deg. of temperature, until from some cause or other, it is permitted to come in contact with the heated surface, when violent ebulition immediately takes place, an enormous quantity of steam is instantly produced, and if the vessel be a closed one, as is the case with steam boilers, an explosion is the almost inevitable result.

"The water, on ceasing to be spheroidal, wets, or comes in contact with the heated vessel, and is converted instantly into steam, which being thus generated in a vast quantity, finds an outlet at the point of least resistance.

"This experiment proves that if water exists in the spheroidal state in a boiler, and the boiler be allowed to cool, owing to the extinction of the fire, an explosion is the almost certain consequence.

"A result precisely similar is produced by adding a quantity of cold water to a boiler containing a portion of liquid in a spheroidal state.

"But here the question arises; does water ever become spheroidal in steam boilers? And if it does what are the circumstances which lead to such a dangerous crisis?

"That water contained in boilers does pass into the spheoidal state, there can be no doubt. * * It has actually been seen to be so. Where then are the causes which lead to this occurrence?

"The most obvious cause is deficiency of water in the boiler, owing either to the negligence of the engineman, or to some defect in the feed pipe.—When this deficiency occurs, the boiler (if the furnace be in action) shortly becomes highly heated, and it is by no means an uncommon occurrence for it to reach even a red heat. If the water under these circumstances be thrown in, the first portion becomes of course spheroidal and continues so until by an introduction of a sufficient quantity, the boiler be so far cooled as to be unable to maintain the spheroidal form of the water. No sooner is this the case, than the spheroid comes in contact suddenly with the overheated boiler, bursts into steam, and in all prboability an explosion is the result?"

Another and highly probable cause of water becoming spheroidal is the incrustation of non-conducting substances on the interior surface of the boiler.

From the same paper quoted above we have the opinion expressed that,

"There can be no doubt that a part of the boiler occasionally becomes nearly red hot, although this condition appears inconsistent with the supposition that it is at the same time covered with water. Yet we may have been compelled to adopt this conclusion, from having had ocular demonstration of its possibility.

"The probability of boilers sometimes approaching a red heat, receives a corroborative proof on examination of the iron plates in cases where the boilers have bulged out, and which exhibit an appearance well known to boiler makers, by a peculiar color in the iron surrounding the part which has been red hot.

"We may conclude that the principal cause of boilers becoming unduly heated, is undoubtedly, in a majority of cases, owing to the interposition of indurated iron conducting matter between the heated metal and the water."

This undurated matter is liable to be occasionally thrown off from the surface of the metal, in which case the water comes suddenly upon the heated surface and is repelled by it to a certain degree. Should it be but a small surface thus suddenly exposed, the danger of explosion will be small, but the principle will be the same, and the danger of explosion will be in proportion to the surface of metal thus deprived of its coating of non-conducting matter.

That the contained water in all steam boilers may at times (suitable circumstances concurring) assume this spheroidal form, to a greater or less degree is, we think, beyond question.

We assume, therefore, that the spheroidal theory is a true theory, and also that it will explain and conform to all the testimony collected in this matter, which the common theory (before mentioned and examined) will not do; and by no other theory as yet advanced by persons who have had competent advantage for examination, can this be done.

First; all the testimony goes to prove, as strongly as we ever expect such a fact can be proved, that the boiler was well supplied with water, that the upper and outside tubes were not exposed to the action of great or unusual heat, is proved by their appearance. That the tubes at the bottom and middle of the mass were exposed to great heat, is also proved in the same manner.

How could these tubes be burned, and those which would be the first uncovered escape, if the explosion was occasioned by the water being low?

The only possible explanation for this would be the supposition that the tubes and outside casing of the boiler were exposed to the great heat which their appearance indicates, by the fire remaining in the furnace after the explosion took place; and that those tubes which escaped had at that time no circulation through them.

But the evidence so far as it goes, shows that the fire was low at the time, and that but a short time elapsed before the fire was put out, and after the explosion, the shell of the boiler, which was so much burned, was exposed to a circulation of air on all sides. It is to be regretted that more precise information cannot be had on this point; but the fact that the upper rows of the tube escaped the extreme heat which the others indicate, seems to prove conclusively that the water could not have been at any time below them, so as to leave them uncovered; also those burned were subjected to the action of the water after they were heated, which could not be done if heated after the explosion. This, and the other reasons, which, from the testimony, are opposed to the presumption that the water was low, carry us unavoidably to the conclusion that the difficulty was local, and beneath the ordinary level of the water, and was occasioned by the undue heating of the lower and middle portion of the tubes, thus giving the contained water the speroidal form before alluded to.

The fire, as appears from the evidence, was low, and gradually falling lower, at the time of the explosion, in this respect conforming to the principles of the spheroidal theory, that an explosion will take place as the temperature is reduced.

The opening of the aperture connected with the steam whistle, undoubtedly hastened the catastrophe; but may very readily be accounted for upon the hypothesis, that a slight agitation of the water would reduce the spheroidal form of the water into highly explosive steam.

The causes which combine to produce this spheroidal form, their combinations and degrees, yet remain to be demonstrated; but it is considered, that in all reasonable probability, this is at least one instance of explosion from this form; and that it may induce others to collect and arrange the facts as they arise, is one reason that we have been induced to go so far into the detail of the matter.

That they may and will occur with locomotive engines of the present construction is possible, as the passages for the water between the tubes are so small and so liable to collect incrustations of matter from the water used.

The most obvious remedies for this difficulty, which have been collected during the investigation, are to keep the boilers as free from deposit of non-conducting matter as possible.

To increase as far as practicable the size of the water spaces between the tubes and the use of fusible plugs in the boiler, to indicate an undue heating of any part.

And also to provide some better arrangement for ascertaining the height and condition of the water in the boiler.

In conclusion, your committee would take this opportunity to acknowledge their obligation to W. R. Lee, Esq., General Superintendent, Mr. Griggs, the Superintendent of the Locomotive Department, and other officers and men connected with the Boston and Providence railroad, for their attention and desire to give all the information at their command.

WILLIAM P. PARROTT, Com'r.

Boston, March 6th, 1849.

The Committee. in reaching their conclusions, seem to regard the testimony of the fireman as establishing such facts as it was necessary to know for arriving at such a result. Herein it seems to us is their error. Any one, at all acquainted with the running of locomotives, is aware that from the nature of the service of a fireman, he has not the means, at all times, even if he had the disposition, to take accurate note of the condition of the engine. In this instance, too, the darkness of the night might prevent his judging accurately as to distances, running time, and other facts important to a proper understanding of the whole matter.—His first impression was, that he was scalded from the water of the boiler, but in his recent testimony he thinks he was burned instead of scalded, which shows that subsequent investigation had changed his first impressions. We do not doubt his in-

tegrity, but from the nature of the case, his means of knowledge as to the facts occurring, must be very little else than conjecture.

The commitee assume that it is *proved* that the pumps had been shut off only three minutes before the explosion, and that no fresh water had been thrown into the boiler. Assuming these facts, they conclude that a sufficient pressure of steam could not have been generated by force of the fire alone, in this space of time, to cause the catastrophe, and that the ordinary occasion of similar explosions did not occur. They therefore adopt this idea of the spheroidal theory as the best mode of accounting for the explosion, reconcilable with the supposed facts of the case.

If we have understood this spheroidal theory, it has been supposed that such a result occurs where extremes of heat and cold come in contact. Throw cold water on iron raised to a high degree of heat, and the water flies off in the form of globules or spheroids. But can water assume this form, when *gradually* heated to the requisite temperature, to conform to the theory stated?

If so, the whole value of steam power is in danger of being destroyed, and the results of scientific labor are now to be thrown away. Water may be converted into steam of such highly elastic properties as to exceed some 28 times the explosive force of gunpowder and there is no doubt of the fact that steam may be raised so as to burst the strongest encasing of iron; and the same result may be produced by suddenly injecting into a heated boiler a quantity of water. This water instantly takes the form of steam of such elastic force as to explode. In our opinion by one of these modes the explosion of the Taghconic was produced. We cannot believe that when water is once raised to a highly elastic steam, that it can be condensed, or converted into water in the form of a spheroid without losing its elasticity.—This seems to be the theory of the committee. We had also supposed that water took this form only for an instant, before its entire mass could be equally heated. If this is all the committee mean to convey in their report, then it is only another mode of expressing the ordinary result produced by throwing cold water into a heated boiler. Rather than yield assent to such an hypothesis as that assumed by the committee, we are inclined to believe that the engine driver might have opened one of the pumps at the time of the explosion, and induced the catastrophe without any knowledge on the part of the fireman; or that the length of time that the pumps remained closed, might have been greater than he supposed, either of which would explain the cause of the explosion.

The question is a practical one, of the greatest possible importance. We desire to call attention to it, with a view of obtaining more satisfactory knowledge, and suggesting proper precautions for the safety of the public. We may not have understood the views of the committee. We trust we may yet hear from them again on the subject, and have the benefit of the opinions of others, more competent than ourselves to judge as to the probable cause of these explosions.

☞ General Railroad Law.—Governor Coolidge, of Vermont, has appointed the Hons. Charles K. Williams, of Rutland, Lucius B. Peck, of Montpelier, and Erastus Fairbanks, of St. Johnsbury, Commissioners to digest and prepare a general law, regulating all railroad companies, in conformity with a resolution passed at the last session of the Legislature.

Louisville and Frankfort Railroad.

The President and Directors of the Louisville and Frankfort Railroad Company state for the information of the stockholders, and all whom it may concern, that the Lexington and Ohio railroad company, chartered by the legislatute of Kentucky, to construct a railroad from Lexington to the Ohio river, completed that part of the road between Lexington and Frankfort, in the year 1835 with a flat rail, and an inclined plane at Frankfort, at a cost of about $540,000; and they expended in obtaining the right of way and in grading the route between Frankfort and Louisville between $2 and $300,000. In thus constructing the road, said company obtained a loan of $150,000 on the endorsement of the commonwealth, and gave a mortgage on the whole road and its effects to secure the same, and failing to pay the interest, said road and effects were sold under the provisions of the mortgage, and purchased by the commonwealth in 1842; after which purchase the commonwealth expended about $100,000 in making a full and complete repair; said road has been in operation ever since, being finished to Frankfort and in successful and profitable operation since it was purchased and repaired by the state.—In 1847 a charter was granted by the commonwealth of Kentucky, to the Louisville and Frankfort railroad company, to construct a railroad from Louisville to Frankfort, a distance of 65 miles (as the road has been located) and the commonwealth granted to the company the right of way and work done, etc., by the Lexington and Ohio railroad company at the sum of about $60,000, for which interest at the rate of 6 per cent per annum is to be paid after the road is completed—and about $550,000 of stock has been subscribed and the company organised—and engineers employed, and the road located, and the cost, when all completed and in running order, is estimated at $925,000.

In 1847 a charter was granted to the Lexington and Frankfort railroad company to re-construct the road from Lexington to Frankfort, and the commonwealth transfers to said company the old road from Lexington to Frankfort then in use, with all the rights and privileges, including roadway, depots, etc., in consideration of $150,000. in the stock of the company; which company has raised a subscription of about $250,000, and has organised the company and employed an engineer, and located the road so as to connect with the present road without an inclined plane at Frankfort, and estimated the whole cost of the grade and relaying the whole road with a good T rail, weighing 56 lbs to the lineal yard, from Lexington to Frankfort, a distance of 29 miles complete, with new cars, etc., in running order, at $300,000; which will make the cost of the twenty-nine miles to said company $450,000. This company have purchased the T rail for the whole of the said road, and part of it is on the ground, and they have let the contracts for the new grade, and the grading is nearly completed: and they have contracted for the other materials which they are distributing along the road, and will have it all complete in running order by the 1st of October next. It will be seen that under the provisions of the charter of the Lexington and Frankfort railroad company, and the amendments to the charter of the Louisville and Frankfort company, that when completed both roads are to be run as one continuous road, and the profits of both are to be divided between the stockholders of each pro rata, according to the cost of each road to the respective companies; the cost of the whole road from Lexington to Louisville will be $1,435,000, including the sums paid the commonwealth for the old road.

The city of Louisville subscribed $500,000 to the stock of the Louisville and Frankfort railroad company, and are to raise the same by a tax of one per cent per annum for four years, and the tax for the year 1848 has been levied, and is in the course of collection; and the sum of $109,000 paid to the company, and the residue of the tax for the year 1848 is in the course of collection, and the assessments are being made for the tax for 1849. The road from Louisville to Lagrange, a distance of 27 miles, is under contract for grading, bridging and culverts. The T rail weighing 58 pounds to the lineal yard, has been purchased, and other materials are under contract, and contracts made for laying the same, and will be completed and in running order by the 1st of December next, at the cost, for the 27 miles, of less than $240,000.

The balance of the road from Lagrange to Frankfort is located and being estimated, preparatory to contracting for the grading, bridging, etc., and will be put under contract so as to complete the same in time to have the road in complete running order to Frankfort by the 1st of January, 1851.

The gross receipts of the road from Lexington to Frankfort, with the flat rail and the inclined plane, have been about $60,000 a year, and at the same rate, when the road is completed to Louisville, without any increase, will make the gross receipts $200,000.

It would be safe to calculate the increased business at least $50,000 per annum, and a new business in transporting live hogs and other stock at $20,000 more per annum, which would give a dividend of at least ten per cent., and leave a surplus for contingencies.

The country through which the road passes from Louisville to Lexington, is exceedingly fertile, and it is but reasonable to calculate on a large increase for many years to come, independent of expected extensions and branch roads.

The president and directors of the Louisville and Frankfort railroad company have full confidence that the subscription of $550,000 will be paid, and that they will be able to realise the amount in the course of the present year, and the year 1850, or anticipate what shall remain unpaid, and they have full authority to borrow on the credit of the company the sum of $400,000 to enable them to complet the road and give a deed of trust to secure the same on the road and all its effects, and they propose to negotiate said loan so as to purchase the residue of the iron, and have the road completed by the 1st of January, 1851. They publish herewith the charter and amendments of the Louisville and Frankfort railroad company; also, that part of the charter and amendments of the Lexington and Frankfort railroad company which provides that both roads shall be run as one continuous road. They also publish herewith the estimates of the costs of the road from Louisville to Frankfort, made by Charles N. Warren, the engineer employed by the company, and his statement of the cost of the road from Lexington to Frankfort, and his statements of the receipts of the road from Lexington to Frankfort, and his estimates of the receipts and profits of the whole road when completed, and they state that Mr. Warren was employed in 1842, in repairing the road from Lexington to Frankfort, and afterwards in running the same, and he states the receipts from Lexington to Frankfort on his knowledge of what was done while he managed that road; and they believe that his estimates may be relied upon for the receipts of the whole road, also for the costs of the read; because, as far as contracts have been made, they have been within the estimates; they also append to this publication a copy of the obligation and interest checks, which they propose to negotiate with the deed of trust to secure the same.

Tho. Smith,
James Guthrie,
John I. Jacob,
Wm. H. Field.

Estimate of Cost of Road from Louisville to Frankfort.

Cost of grading, as before reported, 407,322 yards excavation, at 10 cts. per yard	$40,732	20
546,966 yards embankment, at 10 cents per yard	54,296	60
40,933 yards rock excavation, at 50 cts.	10,466	50
2,550 perches culvert masonry, at $1 25 per perch	3,187	50
Cost of grubbing	2,832	00
Number of perch bridge masonry, 3,600, at $5 per perch	18,000	00
Number of perch bridge masonry, 2670, at $3 per perch	8,010	00
Number of running feet of bridge, 250, at $50	12,500	00
Number of running feet of bridge, 360, at $25	9,000	00
Cost of Beargrass viaduct, including fill.	10,000	00
Engineering and graduation	12,850	00
Top dressing of old grade	3,220	00
	195,094	80

SUPERSTRUCTURE.

2054 locust cross ties, at 50c.	$1,027	
400 perch broken stone at $1	400	
10,560 running ft. mud sills at $5,	528	
Laying track, per ton	600	
10,560 chnirs at 2½c	254	
3,000 spikes at 6c	180	
Distributing ties, mud sills and iron, per mile	200	
Engineering, etc	500	
	3,699	
This amount for 65 miles		240,435 00
Grading and bridges		195,094 80
Right of way		15,000 00
Depots		40,009 00
Water stations		5,000 00
Turnout tracks		10,000 00
Turning table and depot tracks		10,000 00
Road furniture		100,000 00
Contingencies		4,470 20
Iron, say $52 per ton delivered		305,000 00
		$925,000 00

Cost of Lexington and Frankfort Railroad.

For each mile of superstructure, 88 gross tons of iron, at 56½	$4,950
5 tons cast iron chains, at $48 per ton	240
Freight on same	15
1½ tons spikes, at $120	180
2050 locust cross ties, at $40	820
5000 feet mud sills, at 4c	209
Hauling materials, etc	95
Laying track, etc., per mile	700
	7,200
Amount for 29 miles	$208,800
Grading 5½ miles at $10,000	55,000
Depots	5,000
Wharf at Frankfort	3,200
Right of way	5,000
1 new locomotive	8,000
Passenger and freighs cars	5,000
Engineering, etc	10,000
	91,200
	300,000
State stock	150,000
	$450,000

RECEIPTS.

25,000 passengers	25,000
15,000 tons freight at $2	30,000
5,000 tons wood, lumber and coal	5,000
	60,000
Running expenses per annum	25,000
	35,000

To wit: seventy-seven hundredths per cent. on the stock.

Estimated Business of the Louisville and Frankfort Railroad.

20,000 through passengers at $2 50	$50,000
20,000 way " at 1 00	20,000
15,000 tons through freight at 3 00	45,000
10,000 tons way " at 1 40	15,000
Mails and expresses	5,000
40,000 hogs and sheep at 40c	16,000
1,000 cattle and horses at $2	2,000
Coal, lumber, wood, etc	5,000
	158,000
Running expenses per annum	50,000
Profits	108,000
Profits of Lexington road	35,000
" in addition by Junction	5,000
	148,000

Being 10 76-100 per cent. on the cost of the two roads, of $1,375,000. C. N. WARREN.

☞ The people in Washington and Orange Counties, Vt., seem determined to have a road from Montpelier to Bradford. At a meeting held in the town of Washington, last Wednesday, a Committee of two from each town interested, were appointed to solicit subscriptions and contract for surveys of the routes.

The Railroad Case Decided.

We understand that the Supreme Court of Tennessee has decided in favor of the right of the corporation of Nashville to take stock in the railroad, the case having been carried to that court on an appeal from a similar decision by the Chancellor. We will publish the decision as soon as we can procure a copy, as it will interest the citizens of Murfreesboro', Shelbyville and other towns that have taken stock in the Nashville and Chattanooga railroad. We presume that our corporation will at once issue bonds to the amount of stock subscribed in the road ($500,000.)

There is nothing now in the way of an early completion of our great work; and in the energy of those who have charge of it we have an assurance that it will be done at the earliest possible moment. —*Nashville Union.*

Electro Magnetism.

Professor Page, who recently obtained from Congress an appropriation of $20,000 to enable him to continue his experiments in testing, in Washington city, the applicability of the electro magnetic power to machinery, has constructed an engine by which a double cylinder printing press is driven as well as if steam was the moving power. It is thought, however, by those who have witnessed the experiments of Professor Page, that though the power which he has arranged will answer very well in cases where motive power is only wanted in small quantities and on rapid calls, it never can come in cometition with steam as a propelling power, for boats, cars, &c. Others look to the experiments now in progress for more satisfactory results.—*Baltimore American.*

☞ The Rolling mill of J. K. Pratt & Son, in Harrisburgh, which has been lying idle for some years, was started on Monday last, and is now turning out very fine boiler plate.

From the Washington Globe.

Gold.

The following communication respecting Gold Mines in Siberia their discovery and administration, from the pen of John L. Hayes, Esq., of the Katahdin Iron Works, Maine, doubtless known to many of our readers for his distinguished attainments in geology, will be read with interest at the present period of excitement on the subject of the gold mines in California:

THE GOLD DEPOSITS OF SIBERIA.

At a time when the recent wonderful discoveries in California are attracting universal attention, a notice of the gold deposits of Siberia, which, from their recent discovery, great richness and distance from the seats of civilization, offer obvious points of comparison with our own El Dorado, would seem to possess unusual interest.

The materials for the notice of the auriferous alluvions of Siberia, which I propose now to give, have been principally compiled from the invaluable repertory of metallurgical knowledge, the *Annales des Mines*, and particularly from an article extracted from the *Gazette du Commerce*, of St. Petersburgh, inserted in the volume of the Annales for 1843.

For some years previous to 1828, the attention of the Russian Government and private adventurers was devoted to working the auriferous alluvions of the western flanks of the Oural Mountains. The works of this district made rapid progress, and establishments for washing the gold were successively organized among the mountains lying further towards the north. But it was generally considered that there was no hope of finding gold in Siberia, or the vast country on the other side of the Oural Mountains; and the directors of the principal mines of that country gave the sanction of their authority to these views. Notwithstanding this, two enterprising merchants, named Popoff and Rezanoff, determined to explore the slopes of the *contreforts* of the Oural chain, which extend their ramifications into Tobolsk. In 1829 they discovered some indications of auriferous deposits, at the foot of the Altai Mountains, in the government of Tomsk; but the product of the washings was so small as to confirm the idea of the unproductiveness of the sands of Siberia.

In 1830, a distinguished engineer of mines having been made Governor of Tomsk, the auriferous sands of this part of the Empire were methodically explored by officers who had obtained experience in the Ourals, and a deposit quite rich in gold was discovered. This discovery entirely changed the ideas which had been entertained respecting the wealth of the soil of Siberia, and encouraged many private adventurers to commence explorations for gold. In 1831, Popoff found in the valleys of the affluants of the Kiy many beds of auriferous sands, but only of moderate richness. In 1831, Rezanoff discovered upon the borders of the Kondoustouyoule a very rich deposit, which is yet celebrated for its productiveness. Under this point the labors of the adventurer were concentrated for several years. In 1836, researches were extended towards the east, in the southern part of Yenisseisk. There, in a country bristling with rocks, and almost inaccessible, a series of exceedingly rich deposits were discovered upon the shores of the Birouzka.

But the treasures of this rich basin were not sufficient for the activity of the explorers, whose numbers constantly increased. In 1839, Rezanoff, with many others, penetrated the northern country, to the vast regions watered by the rivers Upper, Lower and Rocky Toungouska. In 1841, between the last two rivers, they found a great number of beds of auriferous sands, remarkable both for their extent and richness, and which in the immensity of treasures which they contained, surpassed all others before discovered.

We have no detailed account of researches since 1812; but at that period explorers were pushing still further north and east, and the reports which we have of the enormous increase of the products of the auriferous sands of Russia in 1846, show that the explorations were crowned with success.

It is a matter of scientific interest, and it may be a matter of practical importance, as indicating the proper districts for research in California, to notice the nature of the mountains among which the principal auriferous deposits in Siberia have been found.

The middle of Siberia is furrowed by an almost uninterrupted series of imposing chains of mountains, dependent upon those of Central Asia, and designated successively, from east to west, under the name of the Altai, Sayane, Duourie, &c. The important beds of auriferous sands have never been found upon the declivities of the principal chains. Even in the high mountains, which have been explored with the most care, as in the district of the mines of Kolyvan, which abound in copper and silver, no auriferous beds have been found, excepting some which were too poor to be washed with profit. All the beds of auriferous sands important for their extent or richness, as yet discovered in Siberia, have been found upon the declivities of the *contreforts* of the principal ranges, or the lesser hills, which descend in numerous ramifications from the principal ranges. The deposits containing the gold are found scattered between the summits of the different systems of lesser mountains, and in the valleys which are sometimes parallel to the direction of the chain, or transversal to them. They are more often found upon the borders or in the beds of streams of water, or in marshes. Auriferous deposits are never found upon the crests of the lesser heights; and if they are discovered on the declivities, it is always at the foot.

The beds of auriferous sands repose in part upon the underlaying rock, sometimes separated from it by a bed of earth composed of gravel and rounded stones, or a fat clay. In the gravel are found fragments of rock of the nature of the formations which compose the surrounding heights—a proof that the sands have not been formed far from the localities where they are now found.

The mountains are composed principally of phillade, (a foliated or slaty rock,) chloritic and talcose slates, alternating with a calcareous rock without petrifications. These rocks are pierced by veins of quartz and protruded masses of diorite. The presence of the latter, an igneous rock, appears to indicate the points near which the gold may be found. It would occupy too much time to give a detailed enumeration of the different auriferous beds which are worked in Siberia. One of the most celebrated deposites is one called Vosskrenessky, in the basin of the Kiy, owned by the merchants Paladine and Rezanoff—the latter one of the first adventurers.

The bed for several years produced 5 *zolotniks* for 100 *poods*, or one part of gold of seventy-eight thousand of sand. A deposite which contains 1¼ zolotniks to 100 poods, is worked with great profit. This immense bed, whose thickness is at no point less than five English feet, and in many places twenty-seven feet, lies at a depth of over thirty feet under sedimentary beds, in such a manner that the working cannot be carried on under the open sky, and the bed is consequently worked by subterranean galleries. This deposit, in 1842, had produced 330 poods, equal to 14,520 pounds Troy, of gold. The bed called *Spusky*, upon the borders of thd Great Pekin, which throws into the Oudeira, one of the latest discovered, is yet more remarkable. The yield of this bed for one year has been 9 zolotniks for 100 poods, or one part of gold in 43,000 of sand; and it has yielded in that time 4,400 pounds Troy of gold. Although there are doubtless beds which, having a larger extent, contain, upon the whole, greater riches, this deposite, by its relative richness, the quantity of metal which it contains, and the facility with which it is worked, is the most productive in Siberia. It belongs to a single individual, a merchant named Miasnikoff, who has, by his good fortune and enterprise, in a short time become one of the wealthiest men in Russia.

It is interesting to see how insignificant the first attempts at working the sands of Siberia were, and how rapid the progress of the works has been. The following in round numbers are the products of several years after the first explorations; one pood being equal to 43 7-8 lbs. Troy:

In 1830	5 poods,	In 1837	132 poods
In 1831	10 "	In 1838	193 "
In 1832	21 "	In 1839	183 "
In 1833	36 "	In 1840	255 "
In 1834	65 "	In 1841	358 "
In 1835	93 "	In 1842	631 "
In 1836	105 "		

In the year 1842 the auriferous deposits of the Oural Mountains produced 310 poods. The whole product in Russia, in Siberia, and the Ourals, for that year, was 40,557 lbs. Troy. The production, since that period, increased in nearly the same ratio. Leplay, professor of metallurgy, at the school of mines in Paris, estimates, from reliable sources, that the value of gold produced in Russia, from the auriferous sands, in 1846, would be equal to ninety millions of francs, which would make the weight of the metal equal to 78,000 pounds Troy, (thirty-nine tons.) He states that at that time many of the alluvians, worked with profit, contained only one part of gold in two millions of earthly materials worked. Residues, worked at a former period, have been re-worked, which contained only one part in four millions. Some idea may be formed of the labor required to produce this immense mass of treasure, when it is understood that the workings of that single year would cause the extraction, manipulation, and transportation of over fifty million tons of materials, which is more than the total weight of all the materials extracted and elaborated by the collieries and iron establishments in Great Britain. The increase of the gold workings in Siberia has demanded so much iron for tools, steam engines, &c., as to have had an important effect upon the exportation of Russian iron. More extraordinary single masses of gold have been found in the Oural Mountains than in Siberia. The largest mass (pepite) of gold in the world was discovered at Minsk in 1842. It was found in a bed of auriferous sands, at a depth of about twelve feet from the surface of the soil, under the foundations of the establishment for washing. Its weight was 36,020 kilograms—over ninety-six lbs. Troy. Near this, forty-two masses were found, weighing from one to seven lbs. according to Humboldt. The largest pepit of gold before known was found in Anson County, North Carolina, the weight was about fifty-eight pounds.

Before concluding this notice, I must glance at the administrative dispositions which are made for watching and regulating the labors of the adveguturers in the gold districts oi Siberia.

An individual who wishes to explore the mountains of Siberia must have a licence to that effect from the ministry of finances. After he has found a deposit—and it may be remarked that many search in vain and lose all the expenses of their explorations—a tract of land called a parcel is conceded to him by the Government. It is provided that a parcel shall not exceed certain limits, and that the same individual shall not possess two contiguous parcels. The duty claimed by the Government is from 15 to 25 per cent., according to the richness of the deposit, and the explorers are bound to pay four rubbles for one pound of gold extracted, for the expense of a surveillance of the mines. Officers are appointed to lay out the parcels, and to see that all the gold obtained is registered in books provided for that purpose. The gold is first sent to the administration of the mines of Altai. After having been first assayed there, it is sent under charge of officers to the mint of St. Petersburgh. There, a definite assay is made, which fixes the first value of the gold, and the duty which the Government shall retain. This, with the expense of coinage, is deducted, and the remainder sent to the proprietor in pieces of five gold rubles.

The washing of the gold is effected upon inclined planes of different constructions, which are set in movement by horses, hydraulic wheels, or steam power. The machines and processes have been carried to a high degree of perfection, as may be seen by the small per centage of gold in sands which are now worked with profit. The laborers belong principally to the class of convicts; but as the country is traversed by detachments of Cossacks, and all the laborers are under the surveillance of officers of the Government, perfect order and system prevail in the establishments.

The importance of this enterprise to Russia is incalculable. Developing national industry in a desolate country which would otherwise have been almost unknown and wholly unimproved, and creating an immense capital, which, taking another direction, is enjoyed and improved throughout the whole Empire, perpetually supplying a currency, and filling the treasury of the Empire without impoverishing its subjects, it has been to Russia one of the greatest sources of its national prosperity, and has tendered materially to the permanance of the most powerful Empire on the continent of Europe, while so many other governments have tottered and fallen around it.

The view of this great enterprise which we have now taken is peculiarly interesting to us. when a similar and almost parallel enterprise is presented to us on the shores of the Pacific. It shows us, if Siberia can be any example, that the sands of California are not to be exhausted in a few months: but that a field for systematic and well organized labor is there opened, whose products may be doubled for years to come. It has been said that he who finds a mine finds a workshop; the history of the Siberian mines shows that the richest deposits of gold are no exception to this rule, which should not be forgotten by the Californian adventurer. It is singular that such wonderful natural resources should, about the same time, be opened to two people of different races, and occupying the extremes of geographical position and political relations.—The influence of our race and institutions will be seen in the improvement which we shall make of these resources.

Reviews of New Books.

A RUDIMENTRY TREATISE ON THE STEAM-ENGINE for the use of Beginners. By Dr. Lardner. London: Weale. 1848. Pp. 130. Woodcuts.

It is long since we have numbered any of Dr. Lardner's literary productions in our review catalogue, and it is pleasant now to meet him as a laborer in the cause of the dissemination of simplified practical knowledge, through the pages of Mr. Weale's admirable "rudimentary treatises." The present treatise stands No. 11 of the second series, which backs the elementary instructions of the first, with a detail of their actual application by the operative. We are not sure though, that the learned author has made himself sufficiently acquainted with the modern workshop practice for the production of a book like the present, for we find occasional raw matter, which certainly does not relate to English mechanism of a late date. In the first page, where he commences to show "how steam produces mechanical action," he says, "the ends of the cylinder are understood to be closely stopped by lids. One of these lids is cast with the cylinder, and forms, in fact, a part of it; the other is attached to it by screws and nuts, and fitted so exactly that steam cannot escape at the joints." How far the second sentence is correct, our readers will easily judge for themselves.

An example from page 19, *et seq.*, shows the author's acquirements in a better light:—

"HOW STEAM PRODUCES MECHANICAL FORCE BY ITS EXPANSION."

"1. We have seen how a piston is urged from one end to another of a cylinder with a definite force by allowing steam to flow in upon it, and that increased efficacy is given to this by creating a vacuum on the side towards which the piston moves. The steam in this case is supposed to flow from the boiler, and to press the piston forward with a certain uniform force. The piston advances because a fresh portion of steam which enters the cylinder requires more room, to give it which the motion of the piston is necessary.

"When as much steam has entered in this manner as is sufficient to fill the cylinder, then the piston will be driven to the extreme end of it. Now, it is well to observe that in the production of this effect, no quality proper to steam, or which distinguishes steam from any other fluid, is concerned.

"If a liquid (water for example) was made to flow into the cylinder with the same pressure and in the same quantity, it would produce precisely the same effect; in fact, the steam acts thus not because it is an *elastic* fluid, but because it is a fluid, and is urged from the boiler with a certain force.

"2. I now come to notice, however, a mode of action in which steam performs what an inelastic fluid could not perform; one, in short, in which it produces a mechanical effect in virtue of that property which steam enjoys in common with air and other gaseous fluids, and in which inelastic fluids, such as water, do not participate.

"3. Let us suppose that the steam flowing into the cylinder acts upon the piston with a certain definite force, as one ton, and continues so to act as long as it enters the cylinder.

"4. Now, let us imagine that when the piston has been thus pushed to the middle of the cylinder, the aperture at which the steam enters is suddenly closed, so as to prevent any fresh supply. The piston will then be no longer pushed forward by any increased quantity of steam coming from the boiler. It will nevertheless be pressed by the elastic force of the steam, just as it would be by the elastic force of air under the same circumstances; it will still be pressed on by a force of one ton, suposing that no adequate resistance obstructs its motion. It will not therefore come to rest, but will continue to advance. As it advances, the steam, expanding into a larger space, will acquire a proportionately diminishing elastic force, and will press on the piston with a force less than a ton, in exactly the same proportion as the space occupied by the steam is greater than half the cylinder. Ultimately, when the piston arrives at the end of the cylinder, the steam, which originally filled half the cylinder, will fill the whole cylinder; and the pressure upon the piston, which was originally a ton, will then be half a ton.

"5. It appears evident then, that while the piston is thus moved through the latter half of the cylinder, it is urged by a continually decreasing force, which begins with a ton, and ends with half a ton.

"6. If we could calculate the average amount of this moving force, we could at once declare the mechanical effect which it produced through the latter half of the cylinder in virtue of the expansive power of the steam.

"7. At first view it might appear that the average pressure must be a mean between the original pressure of a ton and the final pressure of half a ton, and that such a mean would therefore be three quarters of a ton. But such a conclusion would be wrong.

"8. The method of calculating the exact average of force decreasing in the manner we have described, requires principles of the higher mathematics, which could not be introduced properly here. By the application of these principles, it appears that the exact average of the varying pressures, in the case we have described, would be 1545 lbs.

"9. The mechanical effect, therefore, obtained in this way from the expansive action of the steam, would be equal to 1545 lbs driven through a space equal to half the length of the cylinder. It appears, then, that nearly 75 per cent. has been added to the

original mechanical efficacy of the steam by this experiment.

"10. It may be asked whether there be any limit to the application of this principle. It is known that other fluids, having the same natural properties as steam, are capable of expansion indefinitely, and it might at first be imagined that there is no limit to the augmentation of the mechanical force which might thus be obtained from steam; but practical considerations show that there are not only limits, but comparatively narrow ones to its application.

"11. It will be observed that the piston, which is urged by the force of expansive steam, is acted upon by a continually diminishing power of impulsion. When the pressure of the steam becomes by expansion less than the load which such piston drives through the intervention of machinery, including the natural resistance of the machinery itself, then it clear that the moving power will cease to be efficacious, and that the piston must come to rest.

"12. The inertia of the machinery may continue the motion somewhat longer than the moment at which an equilibrium takes place between the resistance of the load and the pressure of the piston, but this effect must soon expire.

"13. The expedient by which the expansive principle may be most conveniently extended is to use, in the commencement, steam of high pressure, and great density; such steam may allow of considerable expansion before it loses so much of its force as to be reduced to an equilibrium with the resistance to the piston.

"14. In all cases the expansive principles evidently involves a continual variation in the impelling power ot the piston.

"Now it seldom happens that there is any similar variation in the resistance which the piston is required to overcome; and in that case an irregularity of action would ensue. In the commencement, the energy of the impelling force being greater than the resistance, an accelerated motion would be produced, and towards the end, the impelling force becoming less than the resistance, a retarded motion would be the effect. A great variety of contrivances have been suggested by mechanical inventors to equalise this varying action.

"15. The most common and the most beautiful of which is the *fly-wheel*, This is a heavy wheel of metal, well centred, and turning upon its axle with but little friction, so that the force necessary to keep it in uniform motion is inconsiderable. The varying action of the piston is transmitted to this wheel. When the impulsive force is greater than the resistance of the load, the surplus is imparted to the wheel, to which it gives a slight increase of speed. Owing to the great mass of matter in the wheel, an increase of speed which is scarcely sensible absorbs an immense amount of moving force. When the impulsion of the piston by the expansion of the steam becomes less than the resistance, then the momentum of the wheel acts upon the load, and that portion of surplus force which was previously imparted to it is given back, and the wheel assists, as it were, the piston in moving the load when the latter becomes enfeebled by the extreme expansion of the steam.

"16. The fly-wheel is thus, as it were, a magazine of force, which gives and takes according to the exigencies of the machinery. When the moving force is in excess, the fly-wheel absorbs the surplus; when the moving force is deficient, the fly wheel gives back what it absorbed.

"17. Cases occur, however, in the arts, in which the resistance to be overcome by the piston is of a gradually decreasing nature. In such cases, the expansive action of the steam being also gradually decreasing, may be kept in equilibrio with the work without the intervention of the equalising action of the fly. Thus, if the piston work a pump by which a column of water is raised, which column flows off at the top, the length of the column, and therefore its weight, is greatest when the buckets of the pump begin to ascend, and least when they arrive at the summit of their play. The weight in the buckets is in this case of continually decreasing amount, like the decreasing force of expanding steam.

"18. But in most cases some equalising contrivance is necessary where the expansive principle is extensively used, and where anything approaching to uniform action is necessary.

"19. The expansive action of steam is applied in steam-engines in various ways, but by far the most usual is that which we have described in the above illustration, by cutting off the supply of steam at some point before the completion of the stroke. In some cases it is cut off at half-stroke, in some at one-third, and in some at much smaller fractions of the centre stroke."

A sectional elevation of a 60-horse condensing engine, made by Mr. Fairbairn, does duty as a frontispiece, and several excellent cuts of water-gauges, mercurial gauges, and the details of a low-pressure waggon-boiler, are given in the last part of the book. The illustration of the last mentioned article might have been well dispensed with to make way for information upon boilers as they are now constructed.

In so far as the author has kept within the bounds which he assigned to himself, in his earlier works on the same subject, we can add our testimony to the elegant simplicity of his composition; but whenever he oversteps this, he only exhibits the extreme difference which exists between modern and antique engineering.—*Glasgow Practical Mechanics' Jour.*

Railroad to San Francisco.

REMARKS BY P. P. F. DEGRAND,

At the Complimentary Dinner given to Wm. Parker, March 13, 1849.

I take a different view from that which has been presented by the distinguished speakers, who have preceded me. So far from lamenting the departure of our valued friend, I rejoice in his promotion, to a higher salary and especially to a more enlarged sphere of action;—I glory in it, and I trust that many more of our meritorious engineers and superintendents will be called upon from our New England schools to lucrative places in other states, to carry into their railroads the practical talent and economy which can alone secure good dividends.

Good dividends, founded on actual net profits, depend much on the administration of a railroad. If well administered, about one half of the gross income goes for expenses. If administered without proper system, intelligence and economy, the gross revenue is diminished, the expense is increased and the net income is very apt to be "null and void!"

Good dividends are essential to the extension of the system; because these dividends attract naturally the loose capital of widows and orphans and a large proportion of the surplus earnings of the whole community. The New England railroads have thereby become a grand reservoir of Savings Banks on a grand and profitable scale. Bad as the year 1848 has been, as to business generally, the vast amount invested in the completed railroads in New England has in that year, averaged more than 7 per cent. net dividend. What other line of business can boast of a like result, in the disastrous year 1848? and let it not be forgotten that this result is mainly due to the intelligence, economy and thrift of New England administration, in making *good* railroads and carrying them on in the best way.

I rejoice then, that our friend is taken from one of our successful railroads, to carry thrift, economy, and consequent profit to the great line of roads from Baltimore to the Ohio. The Baltimore and Ohio railroad belongs to our fellow citizens and to our common country—their thrift is our thrift; as is the thrift of every portion of our vast empire. I shall rejoice to meet this line at the converging point, when it is prolonged to St. Louis in Missouri. I shall rejoice to meet it, at St. Louis by our Boston lines—the Boston and Buffalo railroad and the Boston and Ogdensburg railroad, also prolonged to St. Louis—where they all will inevitably be, at no distant day—and I glory, in the anticipation of our onward march, in tripple alliance, on the Grand National Central Railroad, from St. Louis to San Francisco—in company with our friend T. H. Benton, to pay a visit to his daughter.

Mr. President—This railroad to San Francisco is a great project, worthy of a great people. It is a great project and should be carried to completion, with a celerity worthy of ourselves—and this can be done by the adoption of the plan I propose. Of the efficiency of this plan, none are more able to judge than the intelligent men now around me.

The distinguishing feature of this plan is, that one single act of legislation shall suffice to secure, practically, mathematically and irrevocably, its completion in the shortest time allowed by its physical obstacles. This will be secured by confiding the care of it to a company into which individuals are to pay $2,000,000 real money, and to which the Government are to lend $98,000,000 of U. S. 6 per cent. stock. Tangible means thus credited, will enable us to finish the road, within the present term of Gen. Taylor's Presidency.

Once confided to a private company, no future freak of legislation can arrest or impede its march, as could be done, at every session of Congress, if it were merely a public work. We, of New England, who, in the last year, have opened 500 miles of railroads amidst all the difficulties of the money market—will certainly be capable (if tangible means are thus confided to us) of constructing and carrying into operation the 1600 miles, from St. Louis to San Francisco, before March 4th, 1853; for there are, on that line, no obstacles greater than we have, on more than one occasion, met and conquered on the rugged, rocky surface of New England. Neither is it to be feared that the snows of the West will arrest our trains while we are able, in the mountains of Berkshire, to pass without interruption through drifts of snow higher than the top of the chimney of our locomotives.

If the railroad to San Francisco is undertaken as a public work, we are warned by the fate of our system of permanent fortifications, that the great resurrection gun may fire before its completion. Our system of permanent fortifications was devised by Gen. Bernard, first appointed to attend to it, in 1816. This system met with the approbation of the Executive of Congress, and of the nation, and deservedly so; for it was the production of a master-mind; the production of the intimate friend and companion and pupil of the highly gifted military genius of the age; and it was sustained by the reasoning of the master-mind, carrying conviction of its necessity and of its efficiency; 33 years have already elapsed since, by universal assent, the system was thus confided to the man who commanded universal approbation; and where is the system? where was it when we were threatened with war with two of the most formidable powers in the world?—France and England—I ask where was it then? and where is it now? Alas! it it is as yet, at its threshold—incomplete—inefficient—and likely to be so for fifty years to come!

The extra expense (over and beyond the cost by railroad) in money and in time of carrying from the U. S. to California 150,000 persons and of bringing back 50,000 persons a year, is upwards of $68,000,000 per annum. The railroad, from St. Louis to San Francisco will cost $100,000,000, and of course the hastening its completion, even two years, will more than cover the whole expense of its construction and equipment.

And a delay of 50 years in carrying this railroad to completion, will (by this mere difference in the cost of transportation) *waste* for the nation $3,400,000,000; a sum a hundred times as large as all the specie now in the United States! a sum, which the most sanguine man dare not predict, as the gathering of the California mines, during a whole century to come!

The existence of a railroad will place California within the reach of our fellow citizens generally, at 2 cents per mile, for 1st class cars, the fare (for 3000 miles, from Boston to San Francisco) will be only $60, making (with the food and time for 5 days) a total of only $80. It will be only half that sum, for 2d class cars. At 25 miles per hour, the passage from Boston to San Francisco, will be made in 5 days; whereas now it averages 100 days, taking the various routes, viz: round Cape Horn; through the Straits of Magellan; over the Isthmus of Darien; and over land.

The loss of time and the great sum of money necessary now to make a trip to California, are entirely beyond the reach of the generality of our enterprising young men; because $500 worth of time and money *must be wasted* by the present mode of passage. Even for those who have at hand the needful sum, it is a great hardship *to be obliged thus to waste it*, instead of keeping it as a moleus of their future fortune. Very few of our richest men in Boston began their career with a sum in hand sufficient to carry them to California, at the present time.

Another distinguishing feature of my plan is that all the materials employed in constructing and equipping the railroad to San Francisco, shall be of domestic origin; thus creating, irrevocably, by a single act of legislation, $100,000,000 worth of American labor, in which, practically, every state in the Union will participate.

A private company will construct and equip the railroad much more economically than the government, and make a saving of at least one third in the expenditure.

The existence of this railroad will defend California and Oregon, and will avert Indian wars, North and South of its line. It the transportation of seamen, of troops, of munitions of war and of the Mail, a great saving will be made in the public Treasury.

If it be said that the plan proposed by me of a private company (furnishing $2,000,000 real capital, and aided by the loan of U. S. stock to the amount of $98,000,000) will not work well, we need only refer to the well known favorable result of the Boston and Albany railroad, in which 3-4ths of the capital was furnished by the stocks of the state of Massachusetts and of the city of Albany. A well conducted railroad has but one thing to do, viz: to serve the public well, as it thereby promotes its own interest, as well as its own self-satisfaction.

The plan which I propose will finish the road in 4 years. Should a delay of 50 years arise from pursuing some other plan, let it be remembered that our population is marked out by our past experience as destined during those 50 years to increase from its present number of 22 millions, to the vast number of 88 millions; and in these 50 years, two generations will have passed to the grave; and let it also be remembered, that the loss of interest, on the cost of construction, during 50 years, will be much more than four-fold its cost.

The plan which I propose will finish the road in 4 years, and thenceforth every mother in the old U. S. will be enabled to hear from her son, if in California, within 7 days by regular mail, and almost instantaneously by telegraph. Every mother then, and every sister, and every one of the fair sisterhood, whose friend may have gone to that distant land, will cherish a plan, which will thus give her news, and give her the chance of a prompt return, or of a flying visit from her relative or friend. Let me then commend the plan to their fostering care. This care will be a sure harbinger of success—as success, in the adoption of the plan, is to be founded on public sentiment; which from their gentle hands, can receive, imperceptibly, the desired impress.

If the gift by the U. S. of 10 miles of land, on the north side of the railroad and of depot grounds, and of materials from the public lands, should prove advantageous to the company, it will (without cost to the public) reward their enterprise, industry and indefatigable attention, and it will also lead to the establishment of other railroads in the great west, thereby advancing very much the value of our public lands, as well as the welfare of the republic.

The mere existence of the railroad to San Francisco will add to the value of our public lands an amount more than covering its whole cost. By creating this additional value, *at an early day*, it will add still more to the means of wealth of the whole country.

The existence of this railroad will render our union with our fellow citizens in California and in Oregon indissoluble. It will afford the means of transmitting government orders; general news and private intelligence by telegraph, and of transmitting the mail in the only way worthy of the age we live in. It will furnish a great market for the productions of the south, and of the Mississippi valley, and for the manufactures, fisheries and imports of the Atlantic states.

St. Louis is marked out as the proper starting point, by the feasibility of the route starting thence, and by its being a central place, already accessible by steam to every portion of the United States, north, south and east of it.

Common sense then dictates the adoption, at the earliest day, of some plan which like the one I propose, shall secure, at once, practically, mathematically and irrevocably, the completion of this railroad, in the shortest possible time. I rejoice that we shall have with us the Maryland Pioneer Line. Near the seat of government, their aid will be of great value to illume the path which is to lead to National honor, National convenience, national interest and National glory.

Let us invoke the friends of internal improvements throughout the Union; let us invoke the public press—that mighty engine, ever ready to move, for great national good. Let us resolve that this great national work shall be carried to completion in a shorter time than any work of equal magnitude was ever constructed by any other nation! And in conclusion let us say:—New England tact and talent, in building and in administering railroads—may this tact and talent spread its innumerable benefits throughout our vast empire!

AMERICAN RAILROAD JOURNAL.

Saturday, April 7, 1849.

Patent India Rubber Oil.

Of all the substances of modern application, that of India rubber seems to be one of the most extraordinary as well as the most useful. We have had occasion to speak of it before in the Journal. One of its most recent, and probably one of its most useful applications has recently been made in using it as an oil, or rather in so combining it with oil, that it holds it in such a condition as to render it capable of increased fluidity, at the same time that it has a sort of toughness, or a fibrous quality like glue. This composition is called "*Devlan's Patent Oil.*" We beg to call attention to the advertisements of Messrs. Allen & Needles, of Philadelphia, and Kennedy & Gelston, of this city, in today's paper, agents for the sale of the above article. We have seen it tested, and have been shown several certificates from responsible parties, tending to prove that besides having all the useful qualities of the best of sperm oil for bearings of machinery, it has still greater lubricating qualities, and not so subject to evaporation or waste. If so, it will introduce an important saving in the expense of working machinery. To railroad companies and machine shops, it is a matter of great importance, and we have no doubt they will all be anxious to test its qualities, and avail themselves of its use if it satisfies the conditions required.

Value of Railroads in Indiana.

The only railroad in actual operation in Indiana is the *Madison and Indianapolis* railroad, extending from Madison, on the Ohio river, 89 miles below Cincinnati, to the capital of the State, a distance of 86 miles. The par value of the stock of this road is $50 per share. A public sale of some shares held by the State, was made a short time since by the auditor of the State, for $64 41 per share, or 29 per cent. advance. It is stated by the Pittsburgh Gazette that the clear net earnings of the road in 1848, were *fifteen per cent.* on the capital employed.

Railroads in the Interior.

CONNECTICUT AND PASSUMPSIC RIVER RAILROAD.

The *Connecticut and Passumpsic River Railroad*, in Vermont, was opened in the fall of 1848, from the mouth of the White River, in the town of Hartford, to Well's River, in the town of Newbury, a distance of 40 miles, following the western bank of the Connecticut. At the mouth of White River, it connects with the *Northern railroad*, furnishing a connected line of railway from Boston, via Concord and Lowell, of 185 miles, to upper Vermont, and New Hampshire. It also connects at the same point with the *Central railroad*, extending west to Northfield, and southerly by way of Windsor, connecting with the Cheshire and Fitchburgh railroads, affording a communication with Boston in a distance of 197 miles.

We have before us the Annual Report of the Directors of this company, from which we gather the following interesting facts as to its curves and grades

Table of Curves and Straight Lane.

27.14	miles of straight line.			
.15	"	curved on a radius of	8595	feet.
1.53	"	" "	5730	"
.27	"	" "	3820	"
4.68	"	" "	2865	"
.19	"	" "	2292	"
3.88	"	" "	1910	"
1.49	"	" "	1432½	"
.25	"	" "	1146	"
39.58				

Table of Grades.

14.64	miles of level.			
1.24	"	on an inclination of	5.28	ft. per mile.
.59	"	" "	7.92	"
3.49	"	" "	10.56	"
5.16	"	" "	13.20	"
4.81	"	" "	15.84	"
5.04	"	" "	21.12	"
1.70	"	" "	23.76	"
2.91	"	" "	26.40	"
39.58				

We have been furnished too, at our request, with a statement of the weekly earnings of the road since it has been under way:

Week ending	*Passengers.*	*Freight.*	*Total.*
1848—Dec. 1 & 2	254 94	222 57	477 51
9	764 50	950 00	1,714 50
16	764 50	1,040 66	1,805 16
23	683 42	922 69	1,606 11
30	579 00	884 85	1,463 85
1849—Jan. 6	602 50	899 40	1,501 90
13	661 51	1,242 18	1,903 69
20	611 34	1,276 81	1,888 15
29	615 68	1,323 79	1,939 47
Feb. 3	557 88	967 06	1,524 94
10	553 83	1,217 50	1,770 98
17	592 81	1,338 81	1,931 67
24	785 31	1,396 91	2,082 22
March 3	817 22	1,157 41	1,974 63
10	723 41	965 79	1,689 20
17	826 99	983 37	1,810 36
24	903 14	763 82	1,666 96

The cheap working of this line of road, having such favorable curves and grades, will certainly give it an aggregate of net earnings beyond most other lines in the country. It is believed that the gross income will be equal at least to $100,000 for the first year.

It is expected that the road will be opened as far as St. Johnsbury, 20 miles north of its present terminus in the fall of 1850.

The distance from Brattleboro' to Bellows Falls, is unquestionably the best unoccupied line for a railroad in New England, as far as the assurance of large dividends are regarded. It will give a continuous line of over 300 miles from New York, more favorable for business, and more attractive to the pleasure travel than almost any route in the country.

Railroads in Canada.

It would be well if the Government of Canada, which is at last awake, would look now and then at its next door. It may be invidious; we cannot help it—it is certainly mortifying; but the mortification we must endure—to be ever and anon contrasting the senile pace of the old country's Government with the springy step of brother Jonathan. A writer well acquainted with the American character warns us that those who would enter into competition with Jonathan "must be up early." The American has been long up and doing; and if our Colonial Government will not subtime its lazy spirit to an activity in some degree commensurate with that of its rival, by the very force of natural causes those magnificent territories must fall into the hands of those who will place them in their proper rank in the scale of nations.

The private enterprise of the United States has already spanned the Isthmus of Panama with several projected railroads. In Canada capital is wanting. Even the *punica fides* of Pennsylvania repudiators is not so fatal to enterprise as the dead inertia with which our Colonial administration hangs upon its Provinces. A portion of the contemporary press of the Colony looks for the regenerative ardour from the repeal of the Navigation Laws, and the extension of commercial freedom. Let us hope, at least, that the Government is at length fully bent on developing the resource of those provinces, building them by that one recognized bond of country, and letting in upon them all the benefits which ought to result from their connection with this powerful country, which has but one great fault—injustices and neglect towards its transmarine dependencies. —*The Emigrant, London, Feb.* 17.

Extraordinary Locomotive Speed.

In a late English paper we have an account of a first class engine on the York and Newcastle railway, which took the express train from York to Darlington, a distance of 45 miles in 40 minutes! It was computed, further, that when new rails were placed on the road, as was soon to be done, the same engine would perform the same service in 30 minutes, which would be at the surprising rate of 90 miles an hour.

Engine Taghconic.

The following is the description of the engine 'Taghconic,' referred to in our article on the Explosion of Locomotive Engines. Though not essential to a proper understanding of the question we think it worth preserving for future reference:

Description of the Engine.

This was one of the large class engines, built by the Boston and Providence road, at their shop, and was put upon the road in January, 1848; so that, consequently, it had been at work about one year at the time of the accident.

The boiler was one of the usual form, consisting of a fire box and cylindrical boiler; the heat being conveyed through the boiler into the smoke arch by a number of tubes.

The following are the principal dimensions of the boiler:

Diameter of the waist or cylinder, outside 40 inches.

Number of tubes 135; made of copper brazed.

Size of the tubes 1 9-16 inches inside diameter; 1 12-16 inches outside diameter.

The space between the tubes and the lower part of the boiler, 0 150 of a foot.

Whole height of the upper row of tubes above the bottom of the boiler, 1 515 feet.

The size of the furnace inside, 3.05 feet in length —the water spaces between the two plates making the fire box 2 inches, or 0 18 foot.

Length of tubes, 10 feet.

The height of the crown of the fire box, above the level of the tubes, 0 27 of a foot to the under side of the bridge bars, which were 0 19 of a foot deep—wrought iron.

The thickness of the iron plates, constituting the shell of the boiler, was for the part forming the casing of the furnace, 3-8 of an inch thick; for the cylindrical part, 5-16 of an inch thick—made of Pennsylvania iron—Lukin's brand.

The boiler was well stayed between the shells of the furnace; and longitudinally between the heads of the boiler, there were six long stay bolts, and also four shorter ones, which were attached to the head of the boiler at one end, and the other bolted to the top plate of the arch.

The boiler was provided with two safety valves of the capacity of 2 1-2 inches diameter, loaded to a pressure of about 90 pounds to the square inch. The gauge cocks were on the front side of the furnace, a little to the right hand of the furnace door.

The outside of the boiler was covered by a casing of pine wood, which was also covered with a casing of sheet iron.

The committee of engine builders, who examined the engine, report, February 7th, that "the construction of the boiler was substantially that which is common to other locomotive boilers, and its material, workmanship and proportions were all sufficiently good."

A steam brake was attached to the top of the boiler, which was carried away, but there is no probability that this had anything to do with the explosion, unless the mode of fastening it to the boiler may have weakened the plate, which there is no reason for believing to have been the case. It is mentioned here, only that all the circumstances may be recorded for future reference.

We copy the following article from the Augusta Chronicle. The Augusta Company have not yet been a year in operation and we deem the gratifiing demonstration which it has afforded to the practical utility of manufacturing enterprises at the south, to be worth all the arguments that have ever been written or spoken against the tariff laws:

The Manufacture of Cotton Goods.—We chronicled a few days since that the Augusta Manufacturing Company had increased its capital fron $160,00 to $200,000, by the unanimous vote of the stockholders. Having many applications for their stock and being allowed by their charter to increase their capital to $500,000, the Board have recently decided to open new books, and receive subscriptions to the amount of $160,000, with a view to build a new mill by the side of the one now in operation.

The present mill is turning out 32,000 yards of cloth a week. which will soon be increased 50,000. The demand for these goods greatly exceeds the supply. Each loom gives a product of 40 yards a day. There is a full supply of worthy females, and of males who seek employment at this important mechanical pursuit. Their wages are good and satisfactory. All classes are beginning to appreciate the wisdom of bringing the loom and the spindle to the cotton, the bread and the meat; all see the folly of being at the useless and the enormous expense of carrying Georgia cotton, breadstuffs and provisions to Old or New England, to be wrought into common goods, for Georgia consumption.

Georgians can do their own carding, spinning and weaving. They will soon make their own shoes and boots, saddles and harness, and tan more leather than they wear out. Nor will we stop at the point which will barely meet the home demand for manufactured articles. Already a gentleman of wealth from another state, who made his money in a cotton mill, is taking preliminary steps to erect one in this city, with a view to spin yarn for export. As there is no lack of water power, no want of laborers and raw material, we may reasonably expect that capitalists will not overlook so promising an opportunity for making money. The processes for picking. carding, spinning and weaving our great staple are among the most simple in the whole range of the mechanical arts. Falling water propels all the machinery; children tend it. Whatever capital, skill and industry can do in the way of manufactures, the citizens of Augusta are bound to accomplish.

P. S. DEVLAN & CO's Patent Lubricating Oil.

THE Subscribers invite the attention of Railroads, Steamboats, Machinists, etc., to the above article of Oil; they are prepared to supply it in any quantity. Certificates of its superiority over all other oils, from several of the largest Works and Railroads, can be seen at our office. KENNEDY & GELSTON,
54 Pine street, New York,
Sole Agents for the New England States and State of New York. 1y14

ENGINEERS.

Arrowsmith, A. T.,
Buckfield Branch Railroad, Buckfield, Me.

Berrien, John M.,
Michigan Central Railroad, Marshall, Mich.

Clement, Wm. H.,
Little Miami Railroad, Cincinnati, Ohio.

Fisk, Charles B.,
Cumberland and Ohio Canal, Washington, D. C.

Felton, S. M.,
Fitchburgh Railroad, Boston, Mass.

Ford, James K.,
New York.

Gzowski, Mr.,
St. Lawrence & Atlantic Railroad, Montreal, Canada.

Gilbert, Wm. B.,
Rutland and Burlington Railroad, Rutland, Vt.

Garnett, C. F. M.
Nashville and Chattanooga R. R., Nashville, Tenn.

Holcomb, F. P.
Southwestern Railroad, Macon, Ga.

Higgins, B.
Mansfield and Sandusky Railroad, Sandusky City, O.

Johnson, Edwin F.
New York and Boston Railroad, Middletown Ct.

Jones C. F.,
South Oyster Bay, L. I.

Latrobe, B. H.,
Baltimore and Ohio Railroad, Baltimore, Md.

Morton, A. C.,
Atlantic and St. Lawrence Railroad, Portland, Me.

McRae, John,
South Carolina Railroad, Charleston, S. C.

Nott, Samuel,
Lawrence and Manchester Railroad, Boston,

Reynolds, L. O.,
Central Railroad, Savannah, Ga.

Roberts, Solomon W.,
Ohio and Pennsylvania Railroad,, Pittsburgh, Pa.

Robinson, James P.,
Aandroseggin & Kennebec Railroad, Waterville, Me.

Schlatter, Charles L.,
Northern Railroad (Ogdensburg), Malone, N. Y.

Stark, George.,
Bost., Con. and Mont. R. R., Meredith Bridge, N. H.

Trimble, Isaac R.,
Philad., Wil. & Baltimore Railroad, Wilmington, Del.

Tinkham, A. W.,
United States Fort, Bucksport, Me.

Thomson, J. Edgar.,
Pennsylvania (Central) Railroad, Philadelphia.

Whipple, S.,
Utica, N. Y.

Williams, E. P.,
Auburn and Schenectady Railroad, Auburn, N. Y.

Williams, Charles H.,
Milwaukie, Wisconsin.

BUSINESS CARDS.

James Laurie, *Civil Engineer,*
No. 23 Railroad Exchange, Boston, Mass.
Railroad Routes explored and surveyed. Estimates, Plans and Specifications furnished for Dams, Bridges, Wharves, and all Engineering Structures.
October 14, 1848. 6m*

James Herron, *Civil Engineer,*
OF THE UNITED STATES NAVY YARD,
PENSACOLA, FLORIDA.,
PATENTEE OF THE
HERRON RAILWAY TRACK.
Models of this Track, on the most improved plans, may be seen at the Engineer's office of the New York and Erie Railroad.

IRON.

Railroad Iron.

THE NEW JERSEY IRON CO'S WORKS AT Boonton, are now in full operation, and can execute orders for Railroad Bars of any required pattern, equal in quality to any made in this country. Apply to DUDLEY B. FULLER, *Agent*,
139 Greenwich street.
New York, October 25, 1848.

Railroad Iron.

THE UNDERSIGNED ARE PREPARED TO contract for the delivery of English Railroad Iron of favorite brands, during the Spring. They also receive orders for the importation of Pig, Bar, Sheet, etc. Iron. THOMAS B. SANDS & CO.,
22 South William street,
February 3, 1849. New York.

English Railroad Iron.

3000 Tons H pattern Rails in store, and to arrive this Spring—58 and 60 lbs per yard; of an approved pattern, best English make, each bar being stamped with the manufacturers's name, and inspected before shipment at the works in Wales. For sale by DAVIS, BROOKS & CO.,
68 Broad srteet.
March 18, 1849 2m.11

Railroad Iron.

RAILROAD IRON & LOCOMOTIVE TYRES imported to order, and constantly on hand, by
A. & G. RALSTON,
4 South Front St., Philadelphia.

Railroad Iron.

THE MOUNT-SAVAGE IRON WORKS, Alleghany county, Maryland, having recently passed into the hands of new proprietors, are now prepared, with increased facilities, to execute orders for any of the various patterns of Railroad Iron. Communications addressed to either of the subscribers will have prompt attention. J. F. WINSLOW, *President*
Troy, N.Y.
ERASTUS CORNING, Albany.
WARREN DELANO, Jr., N.Y.
JOHN M. FORBES, Boston.
ENOCH PRATT, Baltimore, Md.
November 6, 1848.

Railroad Iron.

THE SUBSCRIBERS ARE PREPARED TO take orders for Railroad Iron to be made at their Phœnix Iron Works, situated on the Schuylkill River, near this city, and at their Safe Harbor Iron Works, situated in Lancaster County, on the Susquehannah river; which two establishments are now turning out upwards of 1800 tons of finished rails per month.

Companies desirous of contracting will be promptly supplied with rails of any required pattern, and of the very best quality.

REEVES, BUCK & CO.,
45 North Water St., Philadelphia.
March 15, 1849.

Pig and Bloom Iron.

THE Subscribers are Agents for the sale of numerous brands of Charcoal and Anthracite Pig Iron, suitable for Machinery, Railroad Wheels, Chains, Hollowware, etc. Also several brands of the best Puddling Iron, Juniata Blooms suitable for Wire, Boiler Plate, Axe Iron, Shovels, etc. The attention of those engaged in the manufacture of Iron is solicited by
A. WRIGHT & NEPHEW,
Vine Street Wharf, Philadelphia.

Railroad Iron.

THE Undersigned offer for sale 3000 Tons Railroad Iron at a fixed price, to be made of any required ordinary section, and of approved stamp.

They are generally prepared to contract for the delivery of Railroad Iron, Pig, Bar and Sheet Iron—or to take orders for the same—all of favorite brands, and on the usual terms. ILLIUS & MAKIN.
41 Broad street.
March 29, 1849. 3m.13

Railroad Iron, Pig Iron, &c.

600 Tons of T Rail 60 lbs. per yard.
25 Tons of 2¼ by ½ Flat Bars.
25 Tons of 2½ by 9-16 Flat Bars.
100 Tons No. 1 Gartshrorie.
100 Tons Welsh Forge Pigs.
For Sale by A. & G. RALSTON & CO.
No. 4 So. Front St., *Philadelphia.*

Railroad Iron.

THE TRENTON IRON COMPANY ARE NOW turning out one thousand tons of rails per month, at their works at Trenton, N. J. They are prepared to enter into contract to furnish rails of any pattern, and of the very best quality, made exclusively from the famous Andover iron. The position of the works on the Delaware river, the Delaware and Raritan canal, and the Camden and Amboy railroad, enables them to ship rails at all seasons of the year. Apply to
COOPER & HEWITT, *Agents.*
17 Burling Slip, New York.
October 30, 1848.

Wanted Immediately.

8000 Tons of Inverted T Rail wanted, of about 60 lbs. to the yard, for laying 80 miles of road, by the Columbus and Lake Erie Railroad Company, and Mansfield and Sandusky Railroad Company, 60 miles of which is new road, and to re-lay 20 miles on the last mentioned road.

Proposals will be received until May 15, addressed (under seal) to me, at this place.

Proposals are invited for cash on delivery, and also for 7 per cent. bonds, payable in New York or Boston. Delivery may be made at Oswego, Albany, or New York, or at Portsmouth, on the Ohio river, Montreal, Canada, or at Sandusky city. American Iron would be prefered, except *good* English. Parties proposing, will please name the place preferred for delivery. Delivery to commence as early as June 1st, and complete as early as October 1st, if practicable.

B. HIGGINS, *Superintendent, etc.*
Sandusky City, Ohio, March 15, 1849. 2m.13

Mattewan Machine Works.

THE Mattewan Company have added to their Machine Works an extensive LOCOMOTIVE ENGINE department, and are prepared to execute orders for *Locomotive Engines* of every size and pattern—also *Tenders, Wheels, Axles*, and other railroad machinery, to which they ask the attention of those who wish such articles, before they purchase elsewhere.

STATIONARY ENGINES, BOILERS, ETC., Of any required size or pattern, arranged for driving *Cotton, Woollen, or other Mills*, can be had on favorable terms, and at short notice.

COTTON AND WOOLLEN MACHINERY, Of every description, embodying all the modern improvements, second in quality to none in this or any other country, made to order.

MILL GEARING,
Of every description, may be had at short notice, as this company has probably the most extensive assortment of patterns in this line, in any section of the country, and are constantly adding to them.

TOOLS.
Turning Lathes, Slabbing, Planing, Cutting and *Drilling Machines*, of the most approved patterns, together with all other tools required in machine shops, may be had at the Mattewan Company's Shops, Fishkill Landing, or at 39 Pine street, New York.
WM. B. LEONARD, *Agent.*

T. & C. Wason,

MANUFACTURERS OF EVERY STYLE OF Freight and Baggage Cars—Forty rods east of the depot Springfield, Mass.

Running parts in sets complete. Wheels, axles, or any part of cars furnished and fitted up at short notice and in the best manner.

N. B. Particular attention paid to the manufacture of the *most improved Freight Cars.* We refer to the New Haven, Hartford and Springfield; Connecticut River; Harlem; Housatonic, and Western, Massachusetts, Railroads, where our cars are now in constant use.

PATENT MACHINE MADE HORSE-SHOES.

The Troy Iron and Nail Factory have always on hand a general asssortment of Horse Shoes, made from Refined American Iron.

Four sizes being made, it will be well for those ordering to remember that the size of the shoe increases as the numbers—No. 1 being the smallest. P. A. BURDEN, *Agent*,
Troy Iron and Nail Factory, Troy, N. Y.

SPRING STEEL FOR LOCOMOTIVES, TENDERS AND CARS.—The subscriber is engaged in manufacturing spring steel from 1¼ to 6 inches in width, and of any thickness required: large quantities are yearly furnished for railroad purposes, and wherever used its quality has been approved of. The establishment being large, can execute orders with great promptitude, at reasonable prices, and the quality warranted. Address J. F. WINSLOW, *Agent*,
Albany Iron and Nail Works.

Extension of the Baltimore & Ohio Railroad.

TO CONTRACTORS FOR GRADUATION AND MASONRY.

PROPOSALS are invited for the Graduation and Masonry of the following described sections of this road—the sections averaging a mile in length—commencing in the town of Cumberland; Sections 1, 2, 6, 7, 8 and 10, will be let, embracing considerable rock work along the Potomac river bluffs, and the masonry of several bridges on Section st. Also all the sections from 30 to 45 inclusive, (excepting sections 43 and 44) beginning 28 miles from Cumberland, about a mile below the mouth of Savage river, and terminating at the summit of the mountain. The work upon these sections is heavy, containing much rock excavation and 2 tunnels, each about 600 feet in length, and a stone bridge of considerable size. The whole number of sections now to be let is 20. In the course of the spring and summer upwards of 30 more heavy sections will be put under contract between Cumberland and Three Forks Creek. The remaining sections between those points, and other work beyond the latter, will be let in the spring of 1850.

Specifications of the work on the 20 sections now to be let, will be ready by the 25th of March current.—They will be distributed from the company's offices in Baltimore, Frederick, Harper's Ferry, Cumberland and Washington. The proposals will be directed to the undersigned, at No. 23 Hanover street, Baltimore, and will be received until Saturday, the 28th of April, inclusive. Before making bids the line should be thoroughly examined, and the resident engineers will be in attendance thereon to give information. The most satisfactory testimonials will be demanded. The payments will be made in cash, reserving the usual 20 per cent until the completion of the contract. The most energetic prosecution of the work will be required. By order of the President and Directors.

BENJ. H. LATROBE, *Chief Engineer.*
Baltimore, March 14, 1849 5t.12

UPPER CANADA MINING COMPANY.

INCORPORATED BY ACT OF PARLIAMENT.

NOTICE is hereby given, that an ASSESSMENT OF ONE SHILLING AND THREE PENCE PER SHARE has been levied on the *STOCK OF THE UPPER CANADA MINING COMPANY*—one half thereof, or Seven Pence Halfpenny per share, being payable, at the office of the Company, in Hamilton, or to Messrs. W. & J. CURRIE, Agents, Wall St. New York, on the *First Day of April* next, and the other half on the *First day of July* next ensuing. By order, J. D. BRONDGEEST,
Secretary U. C. M. C.
Hamilton, 24th February, 1849. 12tf

WILLIAM JESSOP & SONS' CELEBRATED CAST-STEEL.

The subscribers have on hand, and are constantly receiving from their manufactory,
PARK WORKS, SHEFFIELD,
Double Refined Cast Steel—square, flat and octagon.
Best warranted Cast Steel—square, flat and octagon.
Best double and single Shear Steel—warranted.
Machinery Steel—round.
Best and 2d gy. Sheet Steel—for saws and other purposes.
German Steel—flat and square, "W. I. & S." "Eagle" and "Goat" stamps.
Genuine "Sykes," L Blister Steel.
Best English Blister Steel, etc., etc., etc.
All of which are offered for sale on the most favorable terms by WM. JESSOP & SONS,
91 John street, New York.

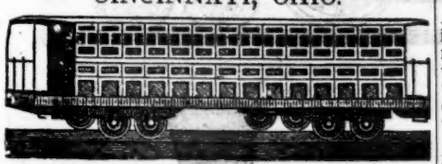
Also by their Agents—
Curtus & Hand, 47 Commerce street, Philadelphia.
Alex'r Fullerton & Co., 119 Milk street, Boston.
Stickney & Beatty, South Charles street, Baltimore.
May 6, 1848.

Direct Action Engines
FOR STEAMBOATS.
THE PATENT DOUBLE CYLINDERS,
AND ALSO
THE ANNULAR RING PISTON ENGINES,
of Messrs. Maudslay, Sons & Field, of London, may be built in the United States, under license, which can be obtained of their agent,
THOMAS PROSSER, C. E.
28 Platt street, New York.
May 6, 1848.

LAP-WELDED WROUGHT IRON TUBES for Tubular Boilers, from 1¼ to 15 inches diameter, and any length not exceeding 17 feet—manufactured by the Caledonian Tube Company, Glasgow, and for sale by IRVING VAN WART,
12 Platt street, New York.
JOB CUTLER, *Patentee.*
☞ These Tubes are extensively used by the British Government, and by the principal Engineers and Steam Marine and Railway Companies in the Kingdom.

Norwich Car Factory,
NORWICH, CONNECTICUT.
AT the head of navigation on the River *Thames*, and on the line of the *Norwich & Worcester Railroad*, established for the manufactory of
RAILROAD CARS,
OF EVERY DESCRIPTION, VIZ:
PASSENGER, FREIGHT AND HAND CARS,
ALSO, VARIOUS KINDS OF
ENGINE TENDERS AND SNOW PLOUGHS.
TRUCKS, WHEELS & AXLES
Furnished and fitted at short notice.
Orders executed with promptness and despatch.
☞ Any communication addressed to
JAMES D. MOWRY,
General Agent,
Norwich, Conn.,
Will meet with immediate attention. 1y8

CAR MANUFACTORY,
CINCINNATI, OHIO.



KECK & DAVENPORT WOULD RESPECTfully call the attention of Railroad Companies in the West and South to their establishment at Cincinnati. Their facilities for manufacturing are extensive, and the means of transportation to different points speedy and economical. They are prepared to execute to order, on short notice, Eight-Wheeled Passenger Cars of the most superior description. Open and Covered Freight Cars, Four or Eight-Wheel Crank and Lever Hand Cars, Trucks, Wheels and Axles, and Railroad Work generally.
Cincinnati, Ohio, Oct. 2, 1848. 44tf

DEAN, PACKARD & MILLS,
MANUFACTURERS OF ALL KINDS OF
RAILROAD CARS,
SUCH AS
PASSENGER, FREIGHT AND CRANK CARS,
— ALSO —
SNOW PLOUGHS AND ENGINE TENDERS
OF VARIOUS KINDS.
CAR WHEELS and AXLES fitted and furnished at short notice; also, STEEL SPRINGS of various kinds; and
SHAFTING FOR FACTORIES.
☞ *The above may be had at order at our Car Factory,*
REUEL DEAN,
ELIJAH PACKARD,
ISAAC MILLS,
} SPRINGFIELD, MASS.
1y48

LAP—WELDED
WROUGHT IRON TUBES
FOR
TUBULAR BOILERS,
FROM 1 1-2 TO 8 INCHES DIAMETER.
These Tubes are of the same quality and manufacture as those so extensively used in England, Scotland, France and Germany, for Locomotive, Marine and other Steam Engine Boilers.
THOMAS PROSSER,
Patentee.
28 Platt street, New York.

THE NEWCASTLE MANUFACTURING Co. continue to furnish at the Works, situated in the town of Newcastle, Del., Locomotive and other steam engines, Jack Screws, Wrought Iron Work and Brass and Iron Castings, of all kinds connected with Steamboats. Railroads, etc.; Mill Gearing of every description; Cast Wheels (chilled) of any pattern and size, with Axles fitted, also with wrought tires, Springs, Boxes and bolts for Cars; Driving and other wheels for Locomotives.
The works being on an extensive scale, all orders will be executed with promptness and despatch. Communications addressed to Mr. William H. Dobbs, Superintendent, will meet with immediate attention.
ANDREW C. GRAY,
a45 President of the Newcastle Manuf. Co.

TO RAILROAD COMPANIES AND MANUfacturers of Railroad Machinery. The subscribers have for sale American and English Bar Iron, of all sizes; English Blister, Cast, Shear and Spring Steel; Juniata Rods; Car Axles, made of double refined iron; Sheet and Boiler Iron, cut to pattern; Tires for Locomotive Engines, and other railroad carriage wheels, made from common and double refined B. O. Iron; the latter a very superior article. The Tires are made by Messrs. Baldwin and Whitney, Locomotive Engine Manufacturers of this city. Orders addressed to them, or to us, will be promptly executed.
When the exact diameter of the wheel is stated in the order, a fit to those wheels is guaranteed, saving to the purchaser the expense of turning them out inside.
THOMAS & EDMUND GEORGE,
a45 N. E. cor. 12th and Market sts., Philad., Pa.

NICOLL'S PATENT SAFETY SWITCH FOR Railroad Turnouts. This invention for some time in successful operation on one of the principal railroads in the country, effectually prevents engines and their trains from running off the track at a switch, left wrong by accident or design. It acts independently of the main track rails; being laid down or removed without cutting or displacing them.
It is never touched by passing trains, except when in use, preventing their running off the track. It is simple in its construction and operation, requiring only two castings and two rails; the latter, even if much worn or used, not objectionable.
Working models of the Safety Switch may be seen at Messrs. Davenport, Bridges & Kirk's Cambridge Port, Mass., and at the office of the Railroad Journal, New York.
Plans, Specifications, and all information obtained, on application to the Subscriber, Inventor and Patentee.
G. A. NICOLLS,
Reading, Pa.

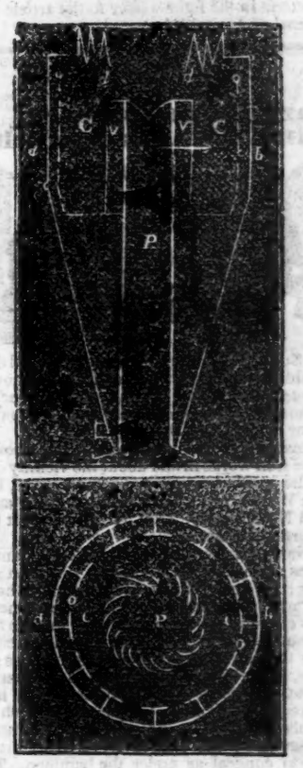
MACHINE WORKS OF ROGERS KETCHUM & GROSVENOR, *Patterson, N. J.* The undersigned receive orders for the following articles manufactured by them of the most superior description in every particular. Their works being extensive, and the number of hands employed being large, they are enabled to execute both large and small orders with promptness and dispatch.
Railroad Work.—Locomotive Steam Engines and Tenders; Driving and other Locomotive Wheels, Axles Springs and Flange Tyres; Car Wheels of Cast Iron a variety of patterns and chills; Car Wheels of Cast Iron with wrought tyres. Axles of best American refined iron; springs; boxes and bolts for cars.
Cotton, Wool and Flax Machinery of all descriptions and of the most improved patterns, style and workmanship.
Mill gearing and millwright work generally, hydraulic and other presses; press screws; callenders; lathes and tools of all kinds; iron and brass castings of all descriptions.
ROGERS, KETCHUM & GROSVENOR,
Patterson, N. J., or 60 Wall St., New York.

IRON BRIDGES, BRIDGE & ROOF BOLTS, etc. STARKS & PRUYN, of Albany, New York, having at great expense established a manufactory with every facility of Machinery for Manufacturing Iron Bridges, Bridge and Roof Bolts, together with all kinds of the larger sizes of Screw Bolts, Iron Railings, Steam Boilers, and every description of Wrought Iron Work, are prepared to furnish to order, on the shortest notice, any of the above branches, of the very best of American Refined Iron, and at the lowest rates.
During the past year, S. & P. have furnished several Iron Bridges for the Erie Canal, Albany Basin, etc. —and a large amount of Railroad Bridge Bolts, all of which have given the most perfect satisfaction.
They are permitted to refer to the following gentlemen:

Charles Cook, Nelson J. Beach, Jacob Hinds,	Canal Commissioners of the State of New York.
Willard Smith, Esq.,	Engineer of the Bridges for the Albany Basin.
Messrs. Stone & Harris,	Railroad Bridge Builders, Springfield, Mass.
Mr. Wm. Howe,	
Mr. S. Whipple,	Engineer & Bridge Builder, Utica, N. Y.

January 1, 1849.

FRENCH & BAIRD'S
Patent Spark Arrester.



TO THOSE INTERESTED IN RAILROADS. Railroad Directors and Managers are respectfully invited to examine an improved Spark Arrester recently patented by the undersigned.
Our improved Spark Arresters have been extensively used during the last year on both Passenger and Freight Engines, and have been brought to such a state of perfection, that no annoyance from sparks or dust from the chimney of engines on which they are used is experienced.
These Arresters are constructed on an entirely different principle from any heretofore offered to the public. The form is such that a rotary motion is imparted to the heated air, smoke and sparks passing through the chimney, and by the centrifugal force thus acquired by the sparks and dust, they are separated from the smoke and steam, and thrown into an outer chamber of the chimney through openings near its top, from whence they fall by their own gravity to the bottom of this chamber; the smoke and steam passing off at the top of the chimney, through a capacious and unobstructed passage, thus arresting the sparks without impairing the power of the engine by diminishing the draught or activity of the fire in the furnace.

These chimneys and arresters are simple, durable and neat in appearance. They are now in use on the following roads, to the managers and other officers of which we are at liberty to refer those who may desire to purchase, or obtain further information in regard to their merits.

R. L. Stevens, president Camden and Amboy railroad company; Rich'd Peters, sup't Georgia railroad, Augusta, Ga.; G. A. Nicolls, sup't Reading railroad, Reading, Pa.; W. E. Morris, pres't Philadelphia, Germantown and Norristown railroad company, Philad.; E. B. Dudley, pres't W. and R. railroad co., Wilmington, N. C.; Col. Jas. Gadsden, pres't S. Carolina railroad co., Charleston, S. C.; W. C. Walker, agent V. and J. railroad, Vicksburg, Miss.; R. S. Van Rensselaer, sup't Hart. and N. H. railroad; W. R. McKee, sup't Lexington and Ohio railroad; T. L. Smith, sup't N. Jersey railroad and transp. co; J. Elliott, sup't M. P., Philadel. and Wilm. railroad; J. O. Sterns, sup't Elizabethtown and Somerville railroad; R. R. Cuyler, pres't Central railroad, Savannah, Ga.; J. D. Gray, sup't Macon, (Ga.) railroad; J. H. Cleveland, sup't of Southern railroad, Monroe, Mich.; M. F. Crittenden, sup't mo.power Central railroad, Detroit, Mich.; G. B. Fisk, pres't Long Island railroad, Brooklyn, L. I.

Orders for these chimneys and arresters, addressed to the subscribers, care of Baldwin and Whitney, of Philadelphia, will be promptly executed.

The subscribers will dispose of single rights, or rights for one or more States on reasonable terms.

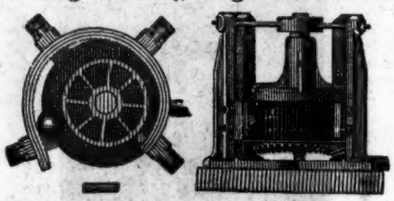
FRENCH & BAIRD.

Philadelphia, Pa., April 6, 1844.

The letters in the figures refer to the article given in the Journal of June, 1844.

MACHINERY.

Henry Burden's Patent Revolving Shingling Machine.



THE Subscriber having recently purchased the right of this machine for the United States, now offers to make transfers of the right to run said machine, or sell to those who may be desirous to purchase the right for one or more of the States.

This machine is now in successful operation in ten or twelve iron works in and about the vicinity of Pittsburgh, also at Phœnixville and Reading, Pa., Covington Iron Works, Md., Troy Rolling Mills, and Troy ron and Nail Factory, Troy, N. Y., where it has giv- universal satisfaction.

Its advantages over the ordinary Forge Hammer are numerous: considerable saving in first cost; saving in power; the entire saving of shinglers, or hammersman's wages, as no attendance whatever is necessary, it being entirely self-acting; saving in time from the uantity of work done, as one machine is capable of working the iron from sixty puddling furnaces; saving of waste, as nothing but the scoria is thrown off, and that most effectually; saving of staffs, as none are used or required. The time required to furnish a bloom being only about six seconds, the scoria has no time to set, consequently is got rid of much easier than when allowed to congeal as under the hammer. The iron being discharged from the machine so hot, rolls better and is much easier on the rollers and machinery. The bars roll rounder, and are much better finished. The subscriber feels confident that persons who will examine for themselves the machinery in operation, will find it possesses more advantages than have been enumerated. For further particulars address the subscriber at Troy, N. Y. P. A. BURDEN.

Railroad Spikes and Wrought Iron Fastenings.

THE TROY IRON AND NAIL FACTORY, exclusive owner of all Henry Burden's Patented Machinery *for making Spikes*, have facilities for manufacturing large quantities upon short notice, and of a quality unsurpassed.

Wrought Iron Chairs, Clamps, Keys and Bolts for Railroad fastenings, also made to order. A full assortment of Ship and Boat Spikes always on hand.

All orders addressed to the Agent at the Factory will receive immediate attention.

P. A. BURDEN, *Agent*,
Troy Iron and Nail Factory, Troy, N. Y.

ENGINE AND CAR WORKS.

DAVENPORT & BRIDGES,

HAVING ASSOCIATED WITH THEM

MR. LEWIS KIRK, OF READING, PA.,

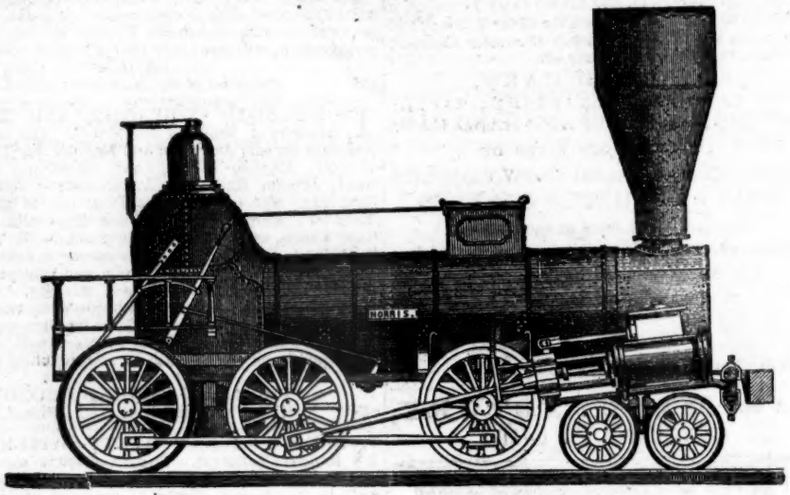
And recently enlarged their Establishment, (making it now the most extensive in the United States,) they are prepared to manufacture to order Locomotive Engines and Cars of every description. Stationary Engines, Steam Hammers, Boilers, and all kinds of Railroad Machinery. Also, Castings and Forge Irons of all kinds —including Chilled Wheels, Frogs, Chairs, Switches, Car Axles, and Locomotive Cranks, Connecting Rods, Steel Springs, Bolts, etc., etc. Orders from all parts of the country solicited for Engines and Cars, or any part or parts of the same. All orders will be furnished at short notice, and on as good terms as any manufactory in the country. Coaches pass our works every fifteen minutes during the day, from Brattle St., Boston.

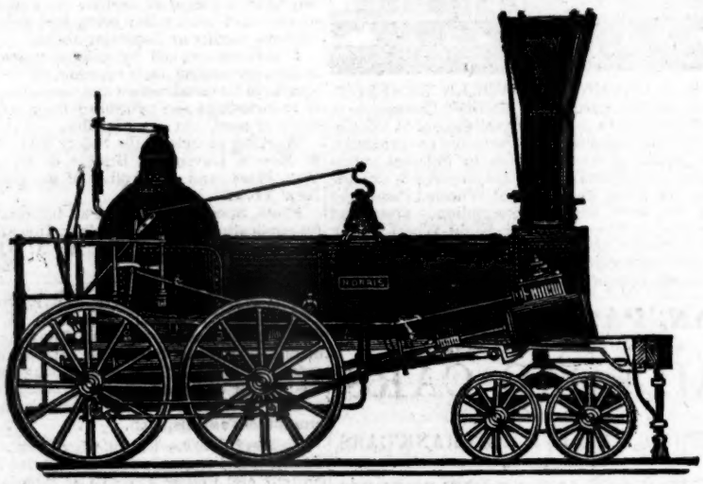
DAVENPORT, BRIDGES & KIRK.

Cambridgeport, Mass., February 16th, 1849.

NORRIS' LOCOMOTIVE WORKS.

BUSHHILL, SCHUYLKILL SIXTH-ST., PHILADELPHIA,





THE UNDERSIGNED Manufacture to order Locomotive Steam Engines of any plan or size.

Their shops being enlarged, and their arrangements considerably extended to facilitate the speedy execution of work in this branch, they can offer to Railway Companies unusunl advantages for prompt delivery of Machinery of superior workmanship and finish.

Connected with the Locomotive business, they are also prepared to furnish, at short notice, Chilled Wheels for Cars of superior quality.

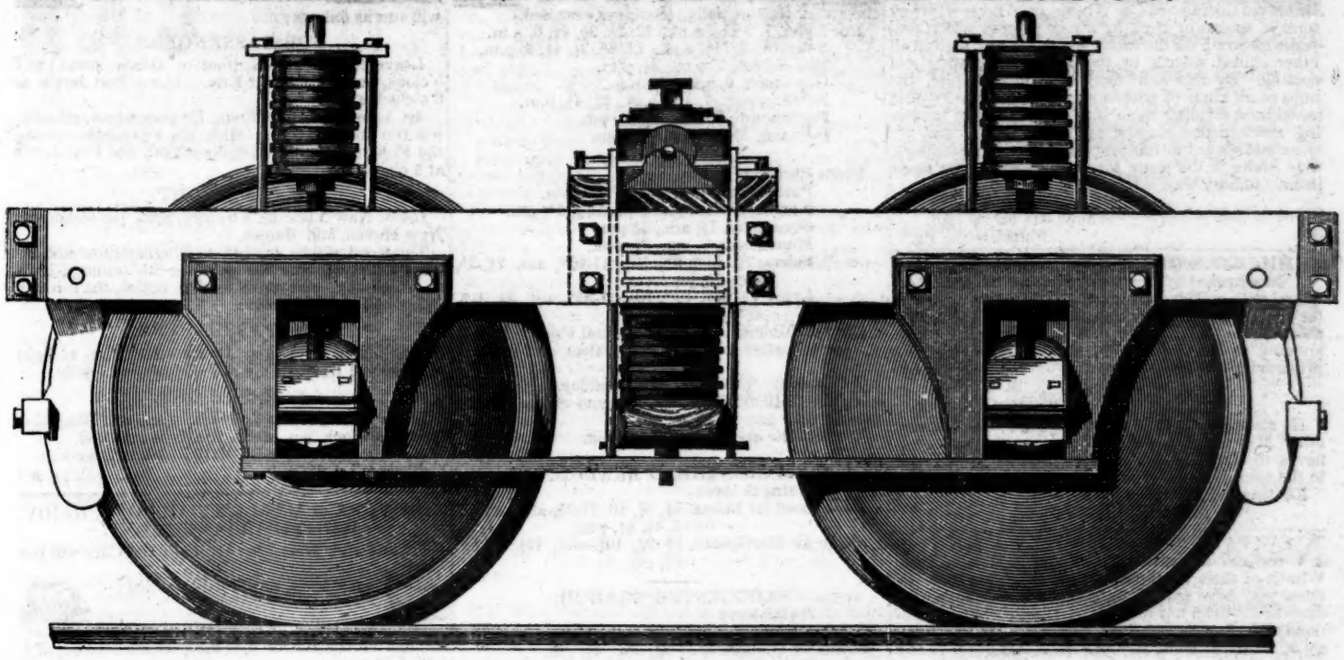
Wrought Iron Tyres made of any required size—the exact diameter of the Wheel Centre, being given, the Tires are made to fit on same without the necessity of turning out inside.

Iron and Brass castings, Axles, etc., fitted up complete with Trucks or otherwise.

NORRIS' BROTHERS.

FOWLER M. RAY'S.

METALLIC INDIA RUBBER CAR SPRINGS.



THE NEW ENGLAND CAR COMPANY have introduced these Springs, and they are now in operation on every Railroad terminating in Boston, and several others in New England and the Middle States. Their qualities are well understood, or may be readily ascertained by every person interested to know them. They require no recommendation from the Company. The only known compound of India Rubber good for anything for this purpose is the Vulcanised India Rubber, invented by Charles Goodyear, of New Haven, and the application of it, and the form in which it is used, were invented by F. M. Ray, of New York. The right to manufacture and sell the substance itself for the purpose of Railroad Carriage Springs, as well as the form and application of it, are held exclusively by the New England Car Company. No other Company, or individual, has any right to sell or use it for such purpose, or has attempted so to use it in this country.

The New England Car Company guarantee the right to use the article they sell for Railroad Carriage Springs only, against all adverse rights, whether under patents or otherwise; and all persons and corporations are cautioned against a similar use of the article, when purchased of any other parties.

The Springs they sell are all manufactured in a uniform manner, and under the immediate inspection of their own Agent, and have been proved and known to answer the purpose. None have been manufactured in this country or imported from abroad besides their own, which would at all answer the purpose; and if any such should be produced, it cannot be used for Car Springs, while Goodyear's patents, and the right of the New England Car Company under them, remain in force.

The New England Car Company are now prepared to answer orders for all that may be called for, on reasonable notice, and uniform and equitable terms.—They invite the most careful examination, and the severest scrutiny, into the merits of their Springs, wherever they have applied them. And if after such examination, your Company should judge it for their interest to adopt them, the N. E. Car Company would respectfully invite the patronage which they think they deserve, and are confident of receiving at your hands.

EDWARD CRANE, *Agent*,
Office 99 State-street.

Orders may also be left with WM. RIDER & BROTHERS, No. 58 Liberty-street, New York, or with F. M. RAY, *Agent*,
100 Broadway, N. Y.

The following article from the pen of Mr. HALE, the President of the Boston and Worcester Railroad, expresses his opinion of this important improvement, as published in the Boston Daily Advertiser of June 7, 1848. He says:

"Of the numerous uses to which the wonderful elasticity and durability of India Rubber renders this material applicable, we are hardly aware of one in which it has been more successful than in forming springs for railroad cars. We have had occasion to observe, for some months past, its application to this use, on one of the passenger cars on the Newton special train of the Boston and Worcester railroad. It is there used, not only for the springs on which the car rests, but for the springs attached to the draw bar at each end of the car, to prevent any jar on the sudden advancement or interruption of the motion of the car. For both these purposes it appears to be admirably adapted, and we do not learn, that during the period in which it has been used, any defect in it has been discovered. It renders the movements of the car extremely easy, and protects it more effectually, we think than any other spring which we have ever seen in use, from every harsh or unpleasant motion, either vertical or horizontal. It is simple in its form and application, extremely light, and little liable to get out of repair.—During the period of some months, in which we have seen the springs in operation, there is no apparent wear or diminution of their efficacy."

The above statement of Mr. Hale agrees with my own observation in all particulars.

WM. PARKER, Supt., B. & W. R. R.
June 8, 1848.

I fully concur in the foregoing statement, from practical observation of its use for the last five months, on the Boston and Worcester railroad corporation cars.

D. N. PICKERING, Jr.,
Supt. Car Building B. & W. R. R.
Boston, June 10, 1848.

The New England Car Company have introduced their Vulcanized India Rubber Car Springs on the roads with which we are respectively connected, and we fully concur with Mr. Hale in the above opinion of their character and properties.

DAVENPORT & BRIDGES, Car Builders.
BRADLEY & RICE, Car Builders.
Boston, June, 1848.

LAWRENCE'S ROSENDALE HYDRAULIC Cement. This Cement is warranted equal to any manufactured in this country, and has been pronounced superior to Francis' "Roman." Its value for Aqueducts, Locks, Bridges, Flooms, and all Masonry exposed to dampness, is well known, as it sets immediately under water, and increases in solidity for years.

For sale in lots to suit purchasers, in tight papered barrels, by JOHN W. LAWRENCE,
142 Front-street, New York.

☞ Orders for the above will be received and promptly attended to at this office. 32 1y.

ENGINEERS' AND SURVEYERS'
INSTRUMENTS MADE BY
EDMUND DRAPER,
Surviving partner of
STANCLIFFE & DRAPER.

No 23 Pear street, near Third, below Walnut, Philadelphia.
y10

TO RAILROAD COMPANIES AND BUILDERS OF MARINE AND LOCOMOTIVE ENGINES AND BOILERS.

PASCAL IRON WORKS.

WELDED WROUGHT IRON TUBES

From 4 inches to ¼ in calibre and 2 to 12 feet long, capable of sustaining pressure from 400 to 2500 lbs. per square inch, with Stop Cocks, T's, L's, and other fixtures to suit, fitting together, with screw joints, suitable for STEAM, WATER, GAS, and for LOCOMOTIVE and other STEAM BOILER FLUES.

Manufactured and for sale by
MORRIS, TASKER & MORRIS.
Warehouse S. E. Corner of Third & Walnut Streets,
PHILADELPHIA.

PATENT HAMMERED RAILROAD, SHIP & BOAT SPIKES. — The Albany Iron Works have always on hand, of their own manufacture, a large assortment of Railroad, Ship and Boat Spikes, from 2 to 12 inches in length, and of any form of head. From the excellence of the material always used in their manufacture, and their very general use for railroads and other purposes in this country, the manufacturers have no hesitation in warranting them fully equal to the best spikes in market, both as to quality and appearance. All orders addressed to the subscribers at the works will be promptly executed.

JOHN F. WINSLOW, *Agent*.
Albany Iron and Nail Works, Troy, N. Y.

The above Spikes may be had at factory prices, of Erastus Corning & Co., Albany; Merritt, & Co., New York; E. Pratt & Brother, Baltimore, Md.

RAILROAD WHEELS.

CHILLED RAILROAD WHEELS.—THE UNdersigned are now prepared to manufacture their Improved Corrugated Car Wheels, or Wheels with any form of spokes or discs, by a new process which prevents all strain on the metal, such as is produced in all other chilled wheels, by the manner of casting and cooling. By this new method of manufacture, the hubs of all kinds of wheels may be made whole—that is, without dividing them into sections—thus rendering the expense of banding unnecessary; and the wheels subjected to this process will be much stronger than those of the same size and weight, when made in the ordinary way.

A. WHITNEY & SON,
Willow St., below 13th,
Philadelphia, Pa.

CHILLED RAILROAD WHEELS.—THE UNdersigned, the *Original Inventor* of the *Plate Wheel* with solid hub, is prepared to execute all orders for the same, promptly and faithfully, and solicits a share of the patronage for those kind of wheels which are now so much preferred, and which he originally produced after a large expenditure of time and money.

A. TIERS,
Point Pleasant Foundry.

He also offers to furnish Rolling Mill Castings, and other Mill Gearing, with promptness, having, he believes, the largest stock of such patterns to be found in the country. A. T.

Kensington, Philadelphia Co., }
March 12, 1848. }

NEW PATENT CAR WHEELS.—THE SUBscribers are now manufacturing Metallic Plate Wheels of their invention, which are pronounced by those who have used them, a superior article, and the demand for them has met the most sanguine anticipations of the inventors. Being made of a superior quality of Charcoal Iron, they are warranted equal to any manufactured.

We would refer Railroad Companies and others to the following roads that have them in use. Hartford and New Haven, Connecticut River, Housatonic, Harlem, Farmington, and Stonington Railroads.

SIZER & CO.,
Springfield, Mass.

RAILROADS.

BOSTON AND PROVIDENCE RAILROAD. On and after MONDAY, OCTOBER 2d, the

Trains will run as follows:—

Steamboat Train—Leave Boston at 5 pm Leaves Providence on the arrival of the train from Stonington.

Accommodation Trains—Leave Boston at 8 am., and 3½ pm. Leave Providence at 8½, a.m., and 3½, pm.

Dedham Trains—Leave Boston at 9 am., 12 m., 3, 6, and 10½ pm. Leave Dedham at 7½, 10½, am., 1½, 4½, and 9 pm.

Stoughton Trains—Leave Boston at 11½ am., and 4½ pm. Leave Stoughton at 8½ am., and 2½ pm.

Freight Trains—Leave Boston at 11 am., and 6 pm. Leave Providence at 4 am., and 7.40 am.

On and after Wednesday, Nov. 1, the DEDHAM TRAIN will run as follows: Leave Boston at 9 am., 12 m., 3, 5½, and 10½ pm. Leave Dedham at 8, 10½, am., 1½, 4½, and 9 pm.

WM. RAYMOND LEE, Sup't.

NORWICH AND WORCESTER RAILROAD. Winter Arrangement.—1848.

Accommodation Trains daily (Sundays excepted.)

Leave Norwich at 6 am., 12 m., and 2½ pm.

Leave Worcester at 6½ and 10 am., and 4½ pm., connecting with the trains of the Boston and Worcester, and Providence and Worcester railroads.

New York & Boston Line. Railroad & Steamers. Leave New York and Boston daily, Sundays excepted, at 5 pm.—At New York from pier No. 1, North River.—At Boston from corner Lincoln and Beach streets, opposite United States Hotel. The steamboat train stops only at Framingham, Worcester, Danielsonville and Norwich.

Freight Trains leave Norwich and Worcester daily, Sundays excepted.—From Worcester at 6½ am., from Norwich at 7 am.

☞ *Fares are Less when paid for Tickets than when paid in the Cars.* ☜

32 1y. S. H. P. LEE, Jr., Sup't.

EASTERN RAILROAD, WINTER ARRANGEment. On and after MONDAY, Oct. 2, 1848,

Trains will leave Eastern Railroad Depot, Eastern Avenue, Commercial-street, Boston, daily, (Sundays excepted.)

For Lynn, 7, 9 11½, a.m., 12, 2½, 3½, 4½, 6, p.m.
Salem, 7, 9, 11½, a.m., 12, 2½, 3½, 4½, 6, p.m.
Manchester, 9, a.m., 3½, p.m.
Gloucester, 9, a.m., 3½, p.m.
Newburyport, 7, 11½, a.m., 2½, 4½, p.m.
Portsmouth, 7, am., 2½, 4½, pm.
Portland, Me., 7, am., 2½, pm.

And for Boston,

From Portland, 7½, am., 3, pm.
Portsmouth, 7, 9½*, am., 5½*, pm.
Newburyport, 7½, 10½*, am., 2, 6*, pm.
Gloucester, 7½, am., 3½ pm.
Manchester, 8, am., 3½, pm.,
Salem, 7½, 8½*, 9*, 10½, 11-40*, am., 2½, 3*, 4½*, 7*, pm.
Lynn, 7½, 8½*, 9½*, 10½, 11-55*, am., 2½, 3½*, 4½*, 7½*, pm.

☞ On Monday, Wednesday, and Friday, a train will leave Boston for Lynn and Salem, at 7 o'clock; p.m.

On Tuesday, Thursday, and Saturday, a train wil leave EAST BOSTON for Lynn and Salem, at 10½ o'clock, pm.

* *Or on their arrival from the East.*

MARBLEHEAD BRANCH.

Trains to leave
Marblehead for Salem, 7½, 8½, 10, 11-25, am. 2, 4½, 6½, pm.
Salem for Marblehead, 7½, 9½, 10½, am., 12½, 3½, 5½, 6¾, pm.

GLOUCESTER BRANCH.

Trains leave
Salem for Manchester at 9½, am., 4½, pm.
Salem for Gloucester at 9½, am., 4½, pm.
Trains leave
Gloucester for Salem at 7½, am., 3½ pm.
Manchester for Salem at 8, am., 3½ pm.
Freight Trains each way daily. Office 1 Merchants' Row, Boston.

Feb. 3. JOHN KINSMAN, Superintendent.

ESSEX RAILROAD—SALEM to LAWRENCE, through Danvers, New Mills, North Danvers, Middleton, and North Andover.

On and after Monday, Oct. 2, 1848,

trains leave daily (Sundays excepted,) Eastern Railroad Depot, Washington-st.

Salem for South Danvers at		7.45, 9, am., 12.45, 3.15, 6.45, pm.
Salem for North Danvers at		7.45, 9, am., 12.45, 3.15, pm.
Salem for Lawrence,		9*, am., 3.15*, pm.
Danvers	"	9.10, am., 3.15, pm.
North Danvers	"	9.20, am., 3.35, pm.
Middleton	"	9.30, am., 3.45, pm.
North Andover	"	10, am., 4.20, pm.
South Danvers for Salem at		7.45, 8.45, 11.30, am. 2, 45.5, pm.
North Danvers	"	8.20, 11.10, am., 1.40, 5.40, pm.
Middleton	"	11, am., 4.30, pm.
North Andover	"	10.35, am., 5.05, pm.
Lawrence	"	10.30*, am., 5*, pm.

* These trains will not stop at Frye's Mills nor Grove-st.

JOHN KINSMAN, Superintendent.

Salem, Oct. 2, 1848.

BOSTON AND MAINE RAILROAD.

Spring Arrangement, 1849.
Outward Trains from Boston

For Portland at 6½ am. and 2½ pm.
For Rochester at 6½ am., 2½ pm.
For Great Falls at 6½ am., 2½, 4½ pm.
For Haverhill at 6½ and 12 m., 2½, 4½ 6 pm.
For Lawrence at 6½, 9, am., 12 m., 2½, 4½, 6, 7½ pm.
For Reading 6½, 9 am., 12 m., 2½, 4½, 6, 7½, 9½* pm.

Inward trains for Boston

From Portland at 7½ am., 3 pm.
From Rochester at 9 am., 4½ pm.
From Great Falls at 6½, 9½ am., 4½ pm.
From Haverhill at 7, 8½ 11 am., 3, 6½ pm.
From Lawrence at 6, 7½, 8½, 11½, am., 1½, 3½, 7 pm.
From Reading at 6½, 7½, 9, am., 12 m., 2, 3½, 6, 7½ pm.

MEDFORD BRANCH TRAINS.

Leave Boston at 7, 9½ am., 12½, 2½, 5½, 6½, 9½* pm.
Leave Medford at 6½, 8, 10½ am., 2, 4, 5½, 6½, pm.

* On Thursdays, 2 hours; on Saturdays, 1 hour later. CHAS. MINOT, Super't.

Boston, March 27, 1849.

NEW YORK AND ERIE RAILROAD. WINTER ARRANGEMENT.

On Monday, January 1st, and until further notice, the trains

will run as follows:

FOR PASSENGERS.

Leave NEW YORK, (foot of Duane street,) at 7 o'clock, am., by steamer Erie. Leave Port Jervis at 6 o'clock am.

An Accommodation Train, for passengers and milk, will run in connection with the steamboat towing the Freight Barge, leaving New York and Port Jervis at 4 o'clock pm.

FOR FREIGHT.

Leave New York at 4 o'clock, pm., per steamboat New Haven, and Barges.

The Road will be opened to Binghampton and intermediate places on Monday, the 8th January, 1849, on which day, and until further notice, the through trains will run as follows:

FOR PASSENGERS.

Leave New York from Duane street Pier, at eight o'clock, and Binghamton at 7 o'clock, am., daily.

FOR FREIGHT.

Leave New York at 4 o'clock, pm., and Binghamton at 7 o'clock, am., daily, Sundays excepted.

H. C. SEYMOUR, Superintendent.

January 1st, 1849. ja3

NEW YORK & HARLEM RAILROAD, DAILY. WINTER ARRANGEMENT.

ON and after December 1st, 1848, the Cars will run

as follows, until further notice:—

Trains will leave the City Hall, New York, for Harlem and Morrisiana at 7, 9, 9.30, 11, am. 12 m., 2, 4, 4.15, 5.30, pm.

Trains will leave the City Hall, New York, for Fordham and Williams Bridge, at 7 30 and 9 30 am., 12 m., 2, 4 15, 5 30 pm.

Trains will leave the City Hall, New York, for Hunt's Bridge, Underhill's and Hart's Corners, at 9 30 am., 4 15 pm.

Trains will leave the City Hall, New York, for Tuckahoe and White Plains, at 7 30 and 9 30 am., 3 and 4 15 pm.

Trains will leave Davis' Brook, Pleasantville, Chapequa, Mount Kisko, Bedford, Mechanicsville, Purdy's and Croton Falls, at 7 30 and 9 30 am., 3 pm.

NOTICE—Passengers are reminded of the great danger of standing upon the platform of the cars, and hereby notified that the practice is contrary to the rules of the Company, and that they do not admit any responsibility for injury sustained by any passenger upon the platforms, in case of accident.

Returning to New York will leave

Morisiana and Harlem at 7 20,8, 8 50, 10 am., 12m., 1 35, 3, 3 45, 5, 5 35 pm.
Fordham and William's Bridge at 7, 8 30, 9 50 am., 1 15, 3 25, 5 20 pm.
Hunt's Bridge at 8 20, am., 3 18 pm.
Underhill's Road at 8 10 am., 3 08 pm.
Tuckahoe at 8 05, 9 30 am., 3 05, 5 pm.
Hart's Corners at 7 55 am., 2 52 pm.
White Plains at 7 45, 9 10 am., 2 45, 4 40 pm.
Davis' Brook at 9 am., 2 35, 4 30 pm.
Pleasantville at 8 49 am., 2 20, 4 19 pm.
Mount Kisko at 8 30 am., 2, 4 pm.
Bedford at 8 25 am., 1 55, 3 55 pm.
Mechanicsville at 8 15 am., 1 45, 3 45 pm.
Purdy's at 8 05 am., 1 35, 3 35 pm.
Croton Falls, at 8 am., 1 30, 3 30 pm.

The trains for Harlem and Morrisiana leaving City Hall at 7, 9, 9 30, 11, 12, 2, 4, and 5 30, and from Morisiana and Harlem at 7 20, 8, 10, 12, 1 35, 3, 3 45, and 5 oclock, will land and receive passengers at 27th st., 42d, 51st, 61st, 79th, 86th, 109th, 115th, 125th, and 132d streets.

The 7 30 am., and 3 pm. Trains from New York to Croton Falls, and the 8 am. Train from Croton Falls will not stop between White Plains and New York, except at Tuckahoe, Williams Bridge and Fordham.

A car will precede each train ten minutes to take up passengers in the city. The last car will not stop, except at Broome st. and 32d street.

Freight Trains leave New York at 6 am. and 1 pm.: leave Croton Falls at 7 am. and 2 30 pm., Sundays excepted.

NOTICE—On Sundays the 7 am. to Harlem and Morrisiana, returning at 8 o'clock, and the 7 30 am. to Croton Falls, returning 1 30 pm., will be omitted, and the 7 am. from Williams Bridge will leave at 7 40, and Morrisiania and Harlem at 8 o'clock am. d1

ST. LAWRENCE & ATLANTIC RAILROAD COMPANY.

Notice is hereby given that the Trains run twice per day between Montreal and St. Hyacinthe, leaving each terminus alternately, until further notice.

The first train starts from St. Hyacinthe at 7 o'clock a.m., reaching Montreal at 8½ a.m., leaving Montreal at 2 p.m., and reaching St. Hyacinthe at 3½ p.m.

The second train leaves Montreal at 9 o'clock, a.m., reaching St. Hyacinthe at 10½ a.m., leaving St. Hyacinthe at 4 p.m., reaches Montreal at 5½ p.m.

THOMAS STEERS, *Secretary.*

March 31, 1849.

BALTIMORE AND SUSQUEHANNA RAILROAD.—Reduction of Fare. Morning and Afternoon Trains between Baltimore and York.—The Passenger Trains run daily, except Sundays, as follows:

Leaves Baltimore at	9 am. and 3½ pm.
Arrives at	9 am. and 6½ pm.
Leaves York at	5 am. and 3 pm.
Arrives at	12½ pm. & 8 pm.
Leaves York for Columbia at	1½ pm. & 8 am.
Leaves Columbia for York at	8 am. & 2 pm.

Fare:

Fare to York	$1 50
" Wrightsville	2 00
" Columbia	2 12½

Way points in proportion.

PITTSBURG, GETTYSBURG, AND HARRISBURG.

Through tickets to Pittsburg via stage to Harrisburg	$9
Or via Lancaster by railroad	10
Through tickets to Harrisburg or Gettysburg	3

In connection with the afternoon train at 3½ o'clock, a horse car is run to Green Spring and Owning's Mill, arriving at the Mills at 5½ pm.

Returning, leaves Owning's Mills at 7 am.

D. C. H. BORDLEY, Sup't.

31 1y Ticket Office, 63 North st.

GEORGIA RAILROAD. FROM AUGUSTA TO ATLANTA—171 MILES.

AND WESTERN AND ATLANTIC RAILROAD, FROM ATLANTA TO DALTON, 100 MILES.

This Road, in connection with the South Carolina Railroad, and Western and Atlantic Railroad, now forms a continuous line, 408 miles in length, from Charleston to Dalton (Cross Plains) in Murray county, Ga. 32 miles from Chattanooga, Tenn.

RATES OF FREIGHT.

		Between Augusta and Dalton. 271 miles.	Between Charleston, and Dalton. 408 miles.
1st class	Boxes of Hats, Bonnets, and Furniture, per cubic foot	$0 18	$0 28
2d class	Boxes and Bales of Dry Goods, Sadlery, Glass, Paints, Drugs, and Confectionary, per 100 lbs.	1 00	1 50
3d class	Sugar, Coffee, Liquor, Bagging, Rope, Cotton, Yarns Tobacco, Leather, Hides, Copper, Tin, Feathers, Sheet Iron, Hollow ware, Castings, Crockery, etc.	0 60	0 85
4th class	Flour Rice, Bacon, Pork, Beef, Fish, Lard, Tallow, Beeswax, Bar Iron, Ginseng, Mill Gearing, Pig Iron, and Grindstones, etc.	0 40	0 65
	Cotton, per 100 lbs.	0 45	0 70
	Molasses per hogshead	8 50	13 50
	" " barrel	2 50	4 25
	Salt per bushel	0 18	
	Salt per Liverpool sack	0 65	
	Ploughs, Corn Shellers, Cultivators, Straw Cutters, Wheelbarrows	0 75	1 50

German or other emigrants, in lots of 20 or more, will be carried over the above roads at 2 cents per mile.

Goods consigned to S. C. Railroad Company will be forwarded free of commissions. Freights payable at Dalton.

F. C. ARMS,

44*1y Sup't of Transportation.

LITTLE MIAMI RAILROAD.—WINTER ARRANGEMENT.

Change of Hours.

On and after Thursday, November 9th, 1848, until further uotice, Passenger Trains will run as follows:

Leave Depot East Front street at 9½ o'clock, am., and 2½ o'clock, p.m., for Milford, Foster's Crossings, Deerfield, Morrow, Waynesville, Spring Valley, Xenia, Yellow Springs, and Springfield.

Returning, leaves Springfield, at 2½ o'clock, and 9½ o'clock, am.

Passengers for New York, Boston, and intermediate points, should take the 9½ o'clock, am., Train from Cincinnati.

Passengers for Columbus, Zanesville, Wheeling and intermediate towns, should take the 9½ o'clock, am., Train.

The Ohio Stage Company are running the following lines in connection with the Trains:

A Daily Daylight Line to Columbus from Springfield in connection with the Morning Train from Cincinnati. Also, Daily Lines to Columbus, from Xenia and Springfield, connecting with the 2½ o'clock, pm. Train from Cincinnati.

The 2½, pm., Train from Cincinnati, and 2½, am., Train from Springfield, are intended for the accommodation of Way Passengers only, and will be eight hours on the road.

Fare from Cincinnati to	Xenia		$1 90
Do	do	Springfield	2 50
Do	do	Sandusky City	6 50
Do	do	Buffalo	10 00
Do	do	Columbus	4 50

For other information and through tickets, apply at the Ticket Office on Broadway, near Front-st., Cincinnati.

W. H. CLEMENTS, Superintendent.

☞ The Company will not be responsible for Baggage exceeding 50 dollars in value, unless the same is returned to the Conductors or Agent, and freight paid at the rate of a passage for every 500 dollars in value to that amount.

BALTIMORE AND OHIO RAILROAD, MAIN STEM.

The Train carrying the Great Western Mail leaves Baltimore every morning at 7½, and Cumberland at 8 o'clock passing Ellicott's Mills, Frederick, Harper's Ferry, Martinsburgh and Hancock, connecting daily each way with—the Washington Trains at the Relay House seven miles from Baltimore, with the Winchester Trains at Harpers Ferry—with the various railroad and steamboat lines between Baltimore and Philadelphia, and with the lines of Post Coaches between Cumberland and Wheeling and the fine Steamboats on the Monongahela Slack Water between Brownsville and Pittsburgh. Time of arrival at both Cumberland and Baltimore 5½ P. M. Fare between these points $7, and 4 cents per mile for less distances.—Fare through to Wheeling $11, and time about 36 hours, to Pittsburgh $10, and time about 32 hours.—Through tickets from Philadelphia to Wheeling $13, to Pittsburgh $12. Extra train daily, except Sundays, from Baltimore to Frederick at 4 P. M., and from Frederick to Baltimore at 8 A. M.

WASHINGTON BRANCH.

Daily trains at 9 A. M., and 5 P. M., and 12 at night from Baltimore, and at 6 A. M. and 5½ P. M. from Washington, connecting daily with the lines North, South and West, at Baltimore, Washington, and the Relay House. Fare $1 60 through between Baltimore and Washington, in either direction, 4 cents per mile for immediate distances. s13 y1

PHILADELPHIA, WILMINGTON, & BALTIMORE RAILROAD.

Summer Arrangement.

April 1st, 1849.—Fare $3.

Leave Philadelphia 8½ am., and 10 pm.
Leave Baltimore 9 am, and 8 pm.
Sunday—Leave Philadelphia at 10 pm.
" " Baltimore at 8 pm.
Trains stop at way stations.

Charleston, S. C.

Through tickets Philadelphia to Charleston, $20.

Pittsburg and Wheeling.

Through ticket, Philadelphia to Pittsburg, $12.
" " Wheeling, 13.
Through tickets sold at Philadelphia office only.

Wilmington Accommodation.

Leaves Philadelphia at 12 m. 4 and 7 pm.
Leaves Wilmington at 7½ am., 4½ and 7 pm.

Newcastle Line.

Leave Philadelphia at 2½ pm.—Baltimore at 1½ pm.
Fare $3.—Second class, $2.
N.B.—Extra baggage charged for.

I. R TRIMBLE, Gen. Supt.

PHILADELPHIA & READING RAILROAD.

Passenger Train Arrangement for 1848.

A Passenger Train will leave Philadelphia and Pottsville daily, except Sundays, at 9 o'clock am.

The Train from Philadelphia arrives at Reading at 12 18 m.

The Train from Pottsville arrives at Reading at 10 43 am.

	Fares. Miles.	No. 1.	No. 2
Between Phila. and Pottsville,	92	$3.50 and	$3.00
" " Reading	58	2.25 and	1.90
" Pottsville "	34	1.40 and	1.20

Five minutes allowed at Reading, and three at other way stations.

Passenger Depot in Philadelphia corner of Broad and Vine streets. 8tf.

CENTRAL RAILROAD—FROM SAVANNAH to Macon. Distance 190 miles.

This Road is open for the transportation of Passengers & Freight

Rate of Passage	$8 00. Freight—
On weight goods generally,	50 cts. per hundred
On measurement goods	13 cts. per cubic ft.
On brls. wet (except molasses and oil)	1 50 per barrel.
On brls. dry (except lime)	80 cts. per barrel.
On iron in pigs or bars, castings for mills, and unboxed machinery	40 cts. per hundred
On hhds. and pipes of liquor, not over 120 gallons	$5 00 per hhd.
On molasses and oil	$6 00 per hhd.

Goods addressed to F. WINTER, Agent, forwarded free of commission.

THOMAS PURSE,
Gen'l Sup't Transportation.

SOUTH CAROLINA RAILROAD.—A Passenger Train runs daily from Charleston, on the arrival of the boats from Wilmington, N. C., in connection with trains on the Georgia, and Western and Atlantic Railroads—and by stage lines and steamers connects with the Montgomery and West Point, and the Tuscumbia Railroad in N. Alabama.

Fare through from Charleston to Montgomery daily	$26 50
Fare through from Charleston to Huntsville, Decatur and Tuscumbia	22 00

The South Carolina Railroad Co. engage to receive merchandize consigned to their order, and to forward the same to any point on their road; and to the different stations on the Georgia and Western and Atlantic Railroad; and to Montgomery, Ala., by the West Point and Montgomery Railroad.

JOHN KING, Jr., Agent.

THE WESTERN AND ATLANTIC RAILROAD.—This Road is now in operation to Oothcaloga, a distance of 80 miles, and connects daily (Sundays excepted) with the Georgia Railroad.

From Kingston, on this road, there is a tri-weekly line of stages, which leave on the arrival of the cars on Tuesday, Thursday and Saturday, for Warrenton, Huntsville, Decatur, and Tuscumbia, Alabama, and Memphis, Tennessee.

On the same days the stages leave Oothcaloga for Chattanooga, Jasper, Murfreesborough, Knoxville and Nashville, Tennessee.

This is the most expeditious route from the east to any of these places.

CHAS. F. M. GARNETT,
Chief Engineer

SCHENECTADY LOCOMOTIVE WORKS, SCHENECTADY, N. Y.

THE undersigned is prepared to execute orders for Locomotive Steam Engines and Tenders; and from long experience in building, can furnish machines of most superior workmanship. The Works are very large, and conveniently situated near the line of Railroad leading to Buffalo, and can furnish Locomotive Tenders and Railroad Machinery at short notice.

E. S. NORRIS.

February 24, 1849.

TO LOCOMOTIVE AND MARINE ENGINE Boiler Builders. Pascal Iron Works, Philadelphia. Welded Wrought Iron Flues, suitable for Locomotives, Marine, and other Steam Engine Boilers, from 2 to 5 inches in diameter. Also, Pipes for Gas, Steam and other purposes; extra strong Tube for Hydraulic Presses; hollow Pistons for Pumps of Steam Engines etc. Manufactured and for sale by

MORRIS, TASKER & MORRIS,
Warehouse S. E. corner 3d and Walnut streets,
Philadelphia.

RIDER'S PATENT IRON BRIDGE.

THE RIDER IRON BRIDGE having been fully tested on the Harlem Railroad, by constant use for about eighteen months, and found to answer the full expectations of its most sanguine friends, is now offered to the public with the utmost confidence as to its great utility over any other Bridge now known.

The plan of this Bridge is to use the iron so as to obtain its greatest longitudinal strength, and at the same time is so arranged as to secure the combined principles of the *Arch, Suspension and Triangle*, all under such controlling power as causes each to act in the most perfect and secure manner, and at the same time impart its greatest strength to the whole work.

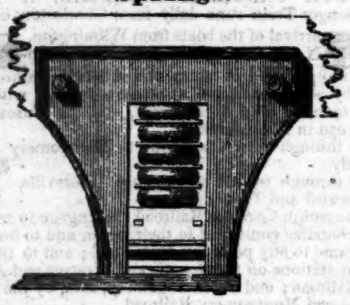
THE IRON RIDER BRIDGE COMPANY are prepared to furnish large quantities of Iron Bridging for Railroad or other purposes, made under the above patent, at short notice, and at prices far *more economical* than the best wood structure, and on *certain conditions*, the first cost may be made the same as wood.

Models, and pamphlets giving full descriptions of the RIDER BRIDGE, with certificates based on actual trial from undoubted sources, will be found at the office of the Company, 74 BROADWAY, *up stairs*, or of W. RIDER & BROTHERS, 58 *Liberty Street*, where terms of contract will be made known, and where orders are solicited.

M. M. WHITE,
Agent for the Company.

November 25, 1848.

Fuller's Patent India-Rubber Springs.



THERE *can now be no ground of opposition whatever to these Springs.* The Commissioner of Patents has not only rejected the application for a Patent for a similar Spring, but *a Patent has just been granted for an entirely new species of India Rubber*, the quality of which can be surpassed by no other kind, as the experiments which have lately been publicly made, have fully proved. No extremes of heat or cold can effect it, nor will any amount of pressure permanently alter its shape. This Patent refutes the statement of the "New England Car Company" as to their sole right to use India Rubber.

The Spring (composed by alternate layers of India Rubber Discs and Metal Plates) is superior to any other form of Spring, for several reasons: It is the lightest, the most simple and most durable—there being less friction in this than in other kind; it can be regulated to any extent desired. A less quantity of Rubber is required in this form to make a good spring than in any other because each disc or ring of India Rubber is firmly supported by metal plates, and forms in itself a distinct spring—nor is any spiral spring required. The Patentee is consequently able to supply efficient springs at a less cost than any other parties can do. Purchasers are guaranteed in the use of these springs.

The New England Car Company have *no* right to make an Indiarubber Spring with a Bolt through the centre. All companies using such a spring are liable to an action.

Fuller's spring has been used nearly four years with complete success. It is applicable equally to Passenger and Freight Cars, to Locomotives and Tenders.—Bumpers and Draw Springs are always kept on hand, which merely require screwing to a car. It has lately been applied also to several kinds of *Machines*.

Action will be brought against all persons infringing upon these patents.

The subscriber will show Models and Drawings of the various modes of application to CARS, Machines, Omnibuses, &c.

G. M. KNEVITT, Agent.

Principal office, No. 78 Broad st., New York.

Branch office, Messrs. James Lee & Co.'s, No. 18 India Wharf, Boston.

Mr. Hale, the President of the Boston adn Worcester Railroad, wrote an article concerning Fuller's Springs. The "New England Car Company" take the liberty of publishing that article, omitting, however, a very important part; it is therefore given in full now, and the portion omitted by the New England Car Company is printed in italics, that the public may judge the manner in which this "company" pervert Mr. Hale's meaning.

[*From the Boston Advertiser of the 7th June*].

INDIA RUBBER SPRINGS FOR RAILROAD CARS.

"Of the numerous uses to which the wonderful elasticity and durability of India rubber, renders this material applicable, we are hardly aware of one, in which it has been more successful than in forming springs for railroad cars. We have had occasion to observe, for some months past, its application to this use, on one of the passenger cars on the Newton special train of the Boston and Worcester railroad.—It is there used not only for the springs on which the car rests, but for the springs attached to the draw bar, at each end of the car, to prevent any jar on the sudden commencement, or interruption of the motion of the car. For both these purposes it seems to be admirably adapted, and we do not learn that during that period in which it has been used, any defect has been discovered. It renders the movements of the car extremely easy, and protects it more effectually, we think, than any other spring we have seen in use, from every harsh or unpleasant motion, either vertical or horizontal. It is also simple in its form and application, extremely light, and little liable to get out of repair. During the period of some months in which we have seen the springs in operation, there is no apparent wear or diminution of its efficiency. *Each spring is composed of several circular layers of rings of India rubber, a thin metallic plate of the same size being interposed between each of the layers. From the simplicity of its form, it cannot be expensive, and it admits of being made more or less elastic almost at pleasure. The invention, we understand, was first patented in England, where it has been introduced into general use on several of the principal railroads, and we have no doubt it will come into very extensive use in this country. The patent for this invention, we understand, has been granted to Mr. W. C. Fuller, in England and France, and also in this country. Mr Knevitt, of New York, is the agent for the patentee in the United States, and he has established a branch office for the supply of the article in this city, as may be learned from an advertisement in another column of this paper.*"

CORROSIVE SUBLIMATE.

THIS article now extensively used for the preservation of timber, is manufactured and for sale by POWERS & WEIGHTMAN, manufacturing Chemists, Philadelphia.

Jan. 20, 1849.

RAILROAD SCALES, ETC.

FAIRBANKS' RAILROAD SCALES.—THE subscribers are prepared to construct at short notice, *Railroad* and *Depot Scales*, of any desired length and capacity. Their long experience as manufacturers—their improvements in the construction of the various modifications, having reference to strength, durability, retention of adjustment, accuracy of weight and dispatch in weighing—and the long and severe tests to which their scales have been subjected—combine to ensure for these scales the universal confidence of the public.

No other scales are so extensively used upon railroads, either in the United States or Great Britain;—and the managers refer with confidence to the following in the United States.

Eastern Railroad.	Boston & Maine Railroad.
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Western Railroad.	Concord Railroad.
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Balt. and Ohio Railroad.	Baltimore and Susq. Road.
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Central (Ga.) Railroad.	Macon and Western Road.
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E. & F. FAIRBANKS & CO.
St. Johnsbury, Vt.

Agents, } FAIRBANKS & Co., 81 Water st., N. York.
} A. B. NORRIS, 196 Market st., Philadelphia.

April 22, 1848. 1y*17

RAILROAD SCALES.—THE ATTENTION of Railroad Companies is particularly requested to Ellicott's Scales, made for weighing loaded cars in trains, or singly, they have been the inventors, and the first to make Platform Scales in the United States;—supposing that an experience of *Twenty years* has given him a knowledge and superior advantage in the business.

The levers of our scales are made of wrought iron, all the bearers and fulcrums are made of the best cast steel, laid on blocks of granite, extending across the pit, the upper part of the scale only being made of wood. E. ELLICOTT has made the largest Railroad Scale in the world, its extreme length was One Hundred and Twenty Feet, capable of weighing ten loaded cars at a single draft. It was put on the Mine Hill and Schuylkill Haven Railroad.

We are prepared to make scales of any size to weigh from five pounds to two hundred tons.

ELLICOTT & ABBOTT,
Factory, 9th st., near Coates, cor. of Melon st.
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JOHN A. ROEBLING, *Civil Engineer*,
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These *Ropes* are now in successful operation on the planes of the Portage railroad in Pennsylvania, on the Public Slips, on Ferries, and in Mines. The first rope put upon Plane No. 3, Portage railroad, has now run four seasons, and is still in good condition.

AMERICAN RAILROAD JOURNAL.

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☞ LETTERS and COMMUNICATIONS for this Journal may be directed to the *Editor*,

HENRY V. POOR, 54 WALL ST.